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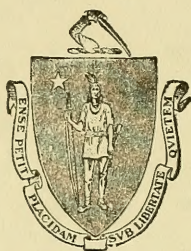
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The M. A. C. Bulletin

Amherst, Mass.

1. The fifty-ninth annual report of the Massachusetts Agricultural College, Part II - Catalogue of the College for 1921-1922.
2. Catalogue of the college for 1921-1922. (Abridged and illustrated.)
3. The fifty-ninth annual report of the Massachusetts Agricultural College, Part I - The report of the President and other officers of administration for the financial year ended Nov. 30, 1921.
4. Summer School.
5. The Ten Weeks' Winter School at the Massachusetts Agricultural College.
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PUBLIC DOCUMENT

No. 31

MASSACHUSETTS
AGRICULTURAL COLLEGE

CATALOGUE, 1921-1922



THE M. A. C. BULLETIN AMHERST, MASSACHUSETTS

VOLUME XIV JANUARY, 1922 NUMBER I

PUBLISHED EIGHT TIMES A YEAR BY THE MASSACHUSETTS
AGRICULTURAL COLLEGE: JAN., FEB., MARCH, MAY,
JUNE, SEPT., OCT., NOV. ENTERED AT THE POST
OFFICE, AMHERST, MASS., AS SECOND CLASS MATTER

THE FIFTY-NINTH ANNUAL REPORT OF THE MASSACHUSETTS AGRICULTURAL COLLEGE

PART II.—CATALOGUE OF THE COLLEGE FOR 1921-1922



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PUBLICATION OF THIS DOCUMENT
APPROVED BY THE
SUPERVISOR OF ADMINISTRATION.

The Commonwealth of Massachusetts

MASSACHUSETTS AGRICULTURAL COLLEGE,
AMHERST, Nov. 30, 1921.

To the Commissioner of Education.

SIR:— On behalf of the trustees of the Massachusetts Agricultural College I have the honor to transmit herewith Part II of the fifty-ninth annual report of the trustees for the fiscal year ended Nov. 30, 1921, this being the catalogue of the college.

Respectfully yours,

EDWARD M. LEWIS,
Acting President.

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THE MASSACHUSETTS
AGRICULTURAL COLLEGE

Without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and mechanic arts in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life. — *Act of Congress, July 2, 1862.*

This issue of the catalogue represents the status of the college for the current college year, with provisional announcement of courses of study and other matters for the year to follow. When deemed necessary, additional announcements are made in a supplementary bulletin, published in the spring.

The college reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue.

CALENDAR.

1921-22-23.

REGULAR AND TWO-YEARS COURSES.

1921.

September 21-24, Wednesday-Saturday,	Entrance examinations.
September 28, Wednesday, 1.30 P.M.,	Fall term begins; assembly.
October 12, Wednesday,	Holiday — Columbus Day.
November 23-25, Wednesday, 12 M.-Friday, 1 P.M.,	Thanksgiving recess.
December 23, Friday, 5 P.M.,	Fall term ends.

1922.

January 2, Monday, 1 P.M.,	Winter term begins.
February 22, Wednesday,	Holiday — Washington's Birthday.
March 24, Friday, 5 P.M.,	Winter term ends.
April 3, Monday, 1 P.M.,	Spring term begins.
April 19, Wednesday,	Holiday — Patriots' Day.
May 30, Tuesday,	Holiday — Memorial Day.
June 24-27, Saturday-Tuesday,	Commencement.
June 29-July 1, Thursday-Saturday,	Entrance examinations.
September 20-23, Wednesday-Saturday,	Entrance examinations.
September 27, Wednesday, 1.30 P.M.,	Fall term begins; assembly.
October 12, Thursday,	Holiday — Columbus Day.
November 29-December 1, Wednesday, 12 M.-Friday 1 P.M.,	Thanksgiving recess.
December 22, Friday, 5 P.M.,	Fall term closes.

1923.

January 1, Monday, 1 P.M.,	Winter term begins.
February 22, Thursday,	Holiday — Washington's Birthday.
March 23, Friday, 5 P.M.,	Winter term ends.
April 2, Monday, 1 P.M.,	Spring term begins.
April 19, Thursday,	Holiday — Patriots' Day.
May 30, Wednesday,	Holiday — Memorial Day.
June 23-26, Saturday-Tuesday,	Commencement.
June 28-30, Thursday-Saturday,	Entrance examinations.
September 19-22, Wednesday-Saturday,	Entrance examinations.
September 26, Wednesday, 1.30 P.M.,	Fall term begins; assembly.

MASSACHUSETTS AGRICULTURAL COLLEGE.

HISTORY. — The Massachusetts Agricultural College was organized under the national land grant act of 1862. This legislation is also known as the Morrill act, the original bill having been framed by Justin Smith Morrill, Senator from Vermont, and its final enactment secured under his leadership. It provided that public lands be assigned to the several States and territories, the funds from the sale of which were to be used to establish and maintain colleges of agriculture and mechanic arts. The Massachusetts Agricultural College was among the first of these institutions established. When this act was passed the Massachusetts Institute of Technology was already organized, and the State of Massachusetts definitely decided that the instruction in the mechanic arts should be at the institute, and that the new institution should confine its work to agriculture. On this account the Massachusetts Agricultural College has the unique distinction of being the only separate agricultural college in the country.

In 1863 the State of Massachusetts accepted the provisions of the Morrill act and incorporated the Agricultural College. The location at Amherst was decided only after long and careful study by the original Board of Trustees. The college was formally opened to students on the 2d of October, 1867, with a faculty of four teachers and with four wooden buildings.

The Massachusetts Legislature has granted money for the erection of practically all of the buildings now on the grounds. In view of the fact that the annual income from the original endowment has been only a few thousand dollars, it has been necessary for the State to assume responsibility for the current expenses of the institution.

ORGANIZATION. — The college is a State institution, and as such is subject to the laws governing and the rules applying to all State departments and institutions. The work of the college is directed by a board of eighteen trustees. Four of these are ex-officio members, — the Governor of the State, the Commissioner of Education, the Commissioner of Agriculture and the president of the college. The other fourteen members are appointed by the Governor for terms of seven years each, or two each year. The immediate control of the institution is vested in the president of the college. The administrative officers, having supervision of the various departments of activity, are directly responsible to the president.

In carrying out its purpose the college has organized three distinct yet correlated types of work, — namely, research, resident instruction and extension service.

RESEARCH. — Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established and supported as a department of the college.

For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the Federal government. In 1906 the Federal government largely increased its support on condition that the money thus provided should be used only for research. The station now receives about three-fourths of its support from the State.

The station is under the direct supervision of the Board of Trustees; the chief officer is the director, who is responsible to the president. It is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of these departments are heads of corresponding departments in the college. The station publishes numerous bulletins and two annual reports, one scientific, the other popular. These publications are free and circulate extensively.

RESIDENT INSTRUCTION. — The college offers an education without tuition fee to any student who is a resident of Massachusetts and who meets the requirements for admission. Women are admitted on the same basis as are men. Students who are not residents of Massachusetts are required to pay a nominal tuition fee. The chief aim of the institution, through its resident instruction, is to prepare men and women for the agricultural vocations. The term "agricultural vocations" is here used in its broadest sense. Courses are offered which give efficient training in various agricultural pursuits, such as general farming, dairying, management of estates, poultry husbandry, fruit growing, market gardening, floriculture, landscape gardening and forestry. Students are also trained for investigation in many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, and for scientific work in chemistry, entomology, botany and microbiology.

Though training for the agricultural vocations is thus the chief concern of the college, students should find the course one that trains them admirably for pursuits in which the sciences are an essential preparation. The course of study aims also to combine an adequate general education with specialized technical and practical training.

FOUR-YEAR COURSES. — Twenty-nine teaching departments offer instruction in agriculture, horticulture, sciences, the humanities, rural social science and rural home making. A system of major courses permits the student to elect major work in one of eighteen departments, and to specialize in it and allied subjects for a period of two years. The degree of bachelor of science is granted on the satisfactory completion of the four years' work of collegiate grade.

SHORT COURSES. — In order to extend the advantages of the institution to those men and women who cannot or do not care to take advantage of the four-year course, various short courses are offered. Chief among these are a two-year course in practical agriculture, a summer school of agriculture and country life, and a winter school of agriculture.

GRADUATE SCHOOL. — The graduate school is organized to provide the necessary training for scientific leadership in agriculture and allied sciences. The degrees of master of agriculture, master of landscape architecture, master of science, doctor of agriculture and doctor of philosophy may be earned upon the completion of satisfactory study, research and thesis.

THE EXTENSION SERVICE. — The extension service is an organized effort to carry systematic and dignified instruction to the thousands of people

throughout the State who are unable, for various reasons, to take advantage of the regular courses offered at the college. It is in reality the "carrying of the college to the people of the State." Every department of the institution, in so far as the regular teaching and research work will permit, contributes what it can to this work. There is also a regular staff of extension workers whose sole business it is to present the instruction of the college to individuals and various organizations throughout the State.

LOCATION AND EQUIPMENT. — The Agricultural College is located in the town of Amherst. The grounds comprise more than 600 acres, lying about a mile north of the village center. The college has also a demonstration forest of 755 acres, located 6 miles north of the campus. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst is 97 miles from Boston, and may be reached by the Central Massachusetts division of the Boston & Maine Railroad, or by the Central Vermont Railroad. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.

MILITARY DRILL. — By Federal law military drill is required of all regular students attending the Massachusetts Agricultural College.

THE CORPORATION.

ORGANIZATION OF 1921.

MEMBERS OF THE CORPORATION.

	TERM EXPIRES
NATHANIEL I. BOWDITCH of Framingham,	1922
WILLIAM WHEELER of Concord,	1922
CHARLES A. GLEASON of New Braintree,	1923
JAMES F. BACON of Boston,	1923
FRANK GERRETT of Greenfield,	1924
HAROLD L. FROST of Arlington,	1924
CHARLES H. PRESTON of Danvers,	1925
CARLTON D. RICHARDSON of West Brookfield,	1925
DAVIS R. DEWEY of Cambridge,	1926
JOHN F. GANNON of Pittsfield,	1926
ARTHUR G. POLLARD of Lowell,	1927
GEORGE H. ELLIS of West Newton,	1927
ELMER D. HOWE of Marlborough,	1928
ATHERTON CLARK of Newton,	1928

MEMBERS EX OFFICIO.

His Excellency Governor CHANNING H. COX, *President of the Corporation.*
 KENYON L. BUTTERFIELD, *President of the College.*
 PAYSON SMITH, *State Commissioner of Education.*
 ARTHUR W. GILBERT, *State Commissioner of Agriculture.*

OFFICERS OF THE CORPORATION.

His Excellency Governor CHANNING H. COX of Boston, *President.*
 CHARLES A. GLEASON of New Braintree, *Vice-President.*
 RALPH J. WATTS of Amherst, *Secretary.*
 FRED C. KENNEY of Amherst, *Treasurer.*
 CHARLES A. GLEASON of New Braintree, *Auditor.*

STANDING COMMITTEES OF THE CORPORATION.¹

Committee on Finance.

CHARLES A. GLEASON, <i>Chairman.</i>	ARTHUR G. POLLARD.
GEORGE H. ELLIS.	CARLTON D. RICHARDSON.
NATHANIEL I. BOWDITCH.	ATHERTON CLARK.

Committee on Course of Study and Faculty.

WILLIAM WHEELER, <i>Chairman.</i>	PAYSON SMITH.
ELMER D. HOWE.	DAVIS R. DEWEY.
JAMES F. BACON.	JOHN F. GANNON.

Committee on Farm.

NATHANIEL I. BOWDITCH, <i>Chairman.</i>	GEORGE H. ELLIS.
FRANK GERRETT.	ARTHUR W. GILBERT.
	CARLTON D. RICHARDSON.

¹ The president of the college is ex-officio member of each committee.

Committee on Horticulture.

HAROLD L. FROST, *Chairman*.
CHARLES A. GLEASON.
CHARLES H. PRESTON.

ELMER D. HOWE.
ARTHUR W. GILBERT.
ATHERTON CLARK.

Committee on Experiment Department.

CHARLES H. PRESTON, *Chairman*.
ARTHUR W. GILBERT.

ARTHUR G. POLLARD.
HAROLD L. FROST.

CARLTON D. RICHARDSON.

Committee on Buildings and Arrangement of Grounds.

GEORGE H. ELLIS, *Chairman*.
FRANK GERRETT.
WILLIAM WHEELER.

JAMES F. BACON.
CHARLES H. PRESTON.
ATHERTON CLARK.

Committee on Extension Service.

ELMER D. HOWE, *Chairman*.
GEORGE H. ELLIS.
HAROLD L. FROST.

DAVIS R. DEWEY.
NATHANIEL I. BOWDITCH.
JOHN F. GANNON.

ARTHUR W. GILBERT.

OFFICERS OF THE INSTITUTION.

As of Nov. 1, 1921.

OFFICERS OF GENERAL ADMINISTRATION.

KENYON L. BUTTERFIELD, A.M., LL.D., President of the College.	President's House.
HENRY S. GREEN, A.B., LL.D., Librarian of the College.	Mount Pleasant.
PHILIP B. HASBROUCK, B.Sc., Registrar of the College.	31 Fearing Street.
SIDNEY B. HASKELL, B.Sc., Director of the Experiment Station.	2 Mount Pleasant.
FRED C. KENNEY, Treasurer of the College.	Mount Pleasant.
EDWARD M. LEWIS, A.M., Dean of the College.	19 Lincoln Avenue.
CHARLES E. MARSHALL, Ph.D., Director of the Graduate School.	44 Sunset Avenue.
RICHARD A. MELLEN, B.Sc., Field Agent.	81 Pleasant Street.
JOHN PHELAN, A.M., Director of Short Courses.	3 Mount Pleasant.
RALPH J. WATTS, B.Sc., Secretary of the College.	101 Butterfield Terrace.
JOHN D. WILLARD, B.A., Director of the Extension Service.	31 Lincoln Avenue.

THE FACULTY OF INSTRUCTION.

KENYON L. BUTTERFIELD, A.M., LL.D., President of the College and Head of the Division of Rural Social Science.	President's House.
CHARLES H. ABBOTT, Ph.D., Instructor in Zoölogy.	3 Dana Street.
MAX F. ABELL, B.Sc., Assistant Professor of Farm Management.	North Amherst.
GEORGE W. ALDERMAN, B.A., Instructor in Physics.	19 Lincoln Avenue.
PAUL J. ANDERSON, Ph.D., Professor of Botany.	25 Lincoln Avenue.
EDGAR L. ASHLEY, A.M., Professor of German.	Amherst House.
ROY C. AVERY, B.Sc., Instructor in Microbiology.	15 Spring Street.
LUTHER BANTA, B.Sc., Assistant Professor of Poultry Husbandry.	70 Lincoln Avenue.
ARTHUR B. BEAUMONT, Ph.D., Professor of Agronomy and Head of Department.	51 Amity Street.
CARL M. BÖGHOLT, B.Sc., Instructor in English.	15 Amity Street.
THOMAS BRADY, Jr., Captain, Cavalry, U. S. A., Assistant Professor of Military Science and Tactics.	Amherst House.

ALEXANDER E. CANCE, Ph.D.,	9 Fearing Street.
Professor of Agricultural Economics and Head of Department.	
JOSEPH S. CHAMBERLAIN, Ph.D.,	Mount Pleasant.
Professor of Organic and Agricultural Chemistry.	
WALTER W. CHENOWETH, M.Sc.,	North Amherst.
Professor of Horticultural Manufactures and Head of Department.	
ORTON L. CLARK, B.Sc.,	16 College Street.
Assistant Professor of Botany.	
G. CHESTER CRAMPTON, Ph.D.,	Fernald Hall.
Professor of Insect Morphology.	
ARTHUR L. DACY, B.Sc.,	2 Allen Street.
Professor of Vegetable Gardening.	
LLEWELLYN L. DERBY,	25 Taylor Street, Holyoke.
Instructor in Physical Education.	
BROOKS D. DRAIN, B.Sc.,	50 Pleasant Street.
Assistant Professor of Pomology.	
HENRY T. FERNALD, Ph.D.,	44 Amity Street.
Professor of Entomology, Head of Department, Chairman of Division of Science.	
JAMES A. FOORD, M.Sc.Agr.,	54 Lincoln Avenue.
Professor of Farm Management, Head of Department, Head of Division of Agriculture.	
WILLARD K. FRENCH, B.Sc.,	10 Hitchcock Street.
Assistant Professor of Pomology.	
GEORGE E. GAGE, Ph.D.,	The Davenport.
Professor of Animal Pathology.	
MARY E. M. GARVEY, B.Sc., ¹	29 South Prospect Street.
Instructor in Microbiology.	
GUY V. GLATFELTER, M.Sc.,	8 Kellogg Avenue.
Assistant Professor of Animal Husbandry.	
HELENA T. GOESSMANN, M.Ph.,	35 South Pleasant Street.
Instructor in English.	
CLARENCE E. GORDON, Ph.D.,	38 Lincoln Avenue.
Professor of Zoölogy and Geology and Head of Department.	
HAROLD M. GORE, B.Sc.,	10 Nutting Avenue.
Assistant Professor of Physical Education.	
CHARLES H. GOULD, B.Sc.,	170 South Pleasant Street.
Assistant Professor of Pomology.	
JOHN C. GRAHAM, B.Sc.Agr.,	68 Lincoln Avenue.
Professor of Poultry Husbandry and Head of Department.	
EMORY E. GRAYSON, B.Sc.,	Belchertown.
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OLGA GRIZZLE, M.Sc.,	97 Pleasant Street.
Instructor in Home Economics.	
LAURENCE R. GROSE, A.B., M.F.,	45 Amity Street.
Professor of Forestry and Head of Department.	
CHRISTIAN I. GUNNESS, B.Sc.,	105 Butterfield Terrace.
Professor of Rural Engineering and Head of Department.	
MARGARET HAMLIN, B.A.,	12 North East Street.
Agricultural Counsellor for Women.	
ELMER A. HARRINGTON, Ph.D.,	7 Allen Street.
Professor of Physics.	
ROY D. HARRIS, B.Sc.,	12 Chestnut Street.
Instructor in Vegetable Gardening.	
ARTHUR K. HARRISON,	8 Allen Street.
Assistant Professor of Landscape Gardening.	
WILLIAM R. HART, M.A., LL.B.,	97 Pleasant Street.
Professor of Agricultural Education and Head of Department.	
PHILIP B. HASBROUCK, B.Sc.,	31 Fearing Street.
Professor of Physics and Head of Department.	
CURRY S. HICKS, B.Pd.,	The Davenport.
Professor of Physical Education and Hygiene and Head of Department.	
MRS. CURRY S. HICKS, ¹	The Davenport.
Instructor in Physical Education.	

¹ Temporary position.

ARAO ITANO, Ph.D.,	3 Fearing Street.
Assistant Professor of Microbiology.	
HARVEY F. JENKINS, B.Sc., ¹	79 Pleasant Street.
Instructor in Vegetable Gardening.	
HENRY F. JUDKINS, B.Sc.,	103 Butterfield Terrace.
Professor of Dairying.	
ARTHUR N. JULIAN, A.B.,	4 Farview Way.
Assistant Professor of German.	
HERMAN KOBBE, Major, Cavalry, U. S. A.,	Sunset Avenue.
Assistant Professor of Military Science and Tactics.	
MARSHALL O. LANPHEAR, B.Sc.,	4 Nutting Avenue.
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EDWARD M. LEWIS, A.M.,	19 Lincoln Avenue.
Professor of Languages and Literature, Head of Department, Acting Head of Division of Humanities.	
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Goessmann Professor of Agricultural Chemistry and Head of Department.	
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Professor of Dairying and Head of Department.	
WILLIAM L. MACHMER, M.A.,	3 Kendrick Place.
Professor of Mathematics and Assistant Dean.	
ALEXANDER A. MACKIMMIE, A.M.,	North Amherst.
Professor of French.	
JOHN J. MAGINNIS, B.Sc.,	35 North Prospect Street.
Instructor in Agricultural Economics.	
ELTON J. MANSELL, B.Sc.,	6 Nutting Avenue.
Instructor in Physical Education.	
CHARLES E. MARSHALL, Ph.D.,	44 Sunset Avenue.
Professor of Microbiology and Head of Department.	
FREDERICK A. McLAUGHLIN, B.Sc.,	4 Nutting Avenue.
Assistant Professor of Botany.	
CHARLES A. MICHELS, M.Sc.,	9 Fearing Street.
Assistant Professor of Agronomy.	
FRANK C. MOORE, A.B.,	10 Allen Street.
Assistant Professor of Mathematics.	
JOHN B. NEWLON,	North Amherst.
Instructor in Rural Engineering.	
JOSEPH F. NOVITSKI, B.Sc., ²	4 Tyler Place.
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Professor of Mathematics and Head of Department.	
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Professor of Veterinary Science and Head of Department.	
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Professor of English.	
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CHARLES A. PETERS, Ph.D.,	Sunset Place.
Professor of Inorganic and Soil Chemistry.	
JOHN PHELAN, A.M.,	3 Mount Pleasant.
Professor of Rural Sociology and Head of Department.	
NORMAN E. PHILLIPS, B.Sc.,	4 Orchard Street.
Assistant Professor of Beekeeping.	
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Instructor in Mathematics.	
WALTER E. PRINCE, A.M.,	25 Amity Street.
Assistant Professor of English.	
GEORGE F. PUSHEE,	North Amherst.
Instructor in Rural Engineering.	

¹ Temporary position.² Absent on leave.

FRANK P. RAND, A.M.,	North Amherst.
Assistant Professor of English.	
WILLIAM S. REGAN, Ph.D.,	84 Pleasant Street.
Assistant Professor of Entomology.	
VICTOR A. RICE, B.Sc.Agr.,	10 Woodside Avenue.
Assistant Professor of Animal Husbandry.	
WILLIAM F. ROBERTSON, B.Sc.,	McClellan Street.
Instructor in Horticultural Manufactures.	
ROLAND W. ROGERS, B.Sc.,	32 North Prospect Street.
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Professor of Poultry Husbandry.	
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JAMES V. V. SHUFFELT, Captain, Cavalry, U. S. A.,	Mount Pleasant.
Assistant Professor of Military Science and Tactics.	
NEWELL L. SIMS, Ph.D.,	60 Pleasant Street.
Professor of Rural Sociology.	
EDNA L. SKINNER, B.Sc.,	50 Lincoln Avenue.
Professor of Home Economics, Head of Department, Adviser of Women.	
RICHARD W. SMITH, Jr., B.Sc.,	8 Kellogg Avenue.
Instructor in Dairying.	
JAMES L. STRAHAN, M.Sc.,	50 Amity Street.
Assistant Professor of Rural Engineering.	
CHARLES H. THAYER,	South East Street.
Instructor in Agronomy.	
CLARK L. THAYER, B.Sc.,	10 Nutting Avenue.
Professor of Floriculture and Head of Department.	
WESTON C. THAYER, B.Sc.,	14 Nutting Avenue.
Instructor in Animal Husbandry.	
GUY A. THELIN, B.Sc.,	21 Pleasant Street.
Instructor in Agronomy.	
PAUL E. THISSELL, A.B.,	81 Pleasant Street.
Instructor in French.	
CHARLES H. THOMPSON, M.Sc.,	Mount Pleasant.
Assistant Professor of Horticulture.	
HAROLD F. TOMPSON, B.Sc.,	10 Temple Street, Arlington.
Professor of Vegetable Gardening and Head of Department.	
RAY E. TORREY, Ph.D.,	Care of Mrs. H. D. Fearing.
Assistant Professor of Botany.	
PAUL W. VIETS,	5 Kendrick Place.
Supervisor of Placement Training.	
FRANK A. WAUGH, M.Sc.,	Campus.
Professor of Landscape Gardening, Head of Department, Head of Division of Horticulture.	
WINTHROP S. WELLES, B.Sc.,	23 Lincoln Avenue.
Professor of Agricultural Education.	
CHARLES WELLINGTON, Ph.D.,	34 Amity Street.
Professor of Chemistry.	
T. GEORGE YAXIS, M.Sc.,	5 Tillson Court.
Assistant Professor of Dairying.	
Professor of Chemistry.	
Professor of Economics and Sociology, and Head of Department.	

STAFF EMPLOYED FOR WORK FOR FEDERAL BOARD FOR VOCATIONAL
EDUCATION.

Mrs. GRACE D. BEAUMONT, B.A.,	51 Amity Street.
Instructor in English.	
EDWARD J. BURKE, B.Sc.,	21 Pleasant Street.
Instructor in Pomology.	
Mrs. ELSIE V. CROCKER,	North Amherst.
Clerk.	
CLARENCE H. DAVIDSON, C.E.,	Mount Pleasant.
Instructor in English and Arithmetic.	
RALPH H. DENMAN, B.Sc.,	70 Lincoln Avenue.
Assistant Professor of Rural Engineering.	
WARREN B. MACK, B.Sc.,	103 Butterfield Terrace.
Instructor in Pomology.	
RICHARD T. MULLER, M.Sc.,	45 East Pleasant Street.
Instructor in Floriculture.	

THE EXPERIMENT STATION STAFF.

KENYON L. BUTTERFIELD, A.M., LL.D.,	President's House.
President of the College.	
SIDNEY B. HASKELL, B.Sc.,	2 Mount Pleasant.
Director of the Experiment Station.	
JAMES R. ALCOCK,	North Amherst.
Assistant in Animal Nutrition.	
HARRY L. ALLEN,	89 Main Street.
Laboratory Assistant, Chemistry.	
PAUL J. ANDERSON, Ph.D.,	25 Lincoln Avenue.
Professor of Botany.	
JOHN G. ARCHIBALD, B.Sc. Agr.,	West Pelham.
Assistant Research Professor of Chemistry.	
ALYN S. BALL,	94 Main Street.
Laboratory Assistant, Botany.	
CARLOS L. BEALS, B.Sc., ¹	- -
Assistant Research Professor of Chemistry.	
ARTHUR I. BOURNE, B.A.,	12 East Pleasant Street.
Assistant Research Professor of Entomology.	
WILLIAM P. BROOKS, Ph.D.,	6 Farview Way.
Consulting Agriculturist.	
ALEXANDER E. CANCE, Ph.D.,	9 Fearing Street.
Professor of Agricultural Economics.	
WALTER W. CHENOWETH, M.Sc.,	North Amherst.
Professor of Horticultural Manufactures.	
ORTON L. CLARK, B.Sc.,	16 College Street.
Assistant Professor of Botany.	
ROBERT L. COFFIN,	19 Phillips Street.
Investigator in Agriculture.	
CHARLES O. DUNBAR, B.Sc.,	84 Pleasant Street.
Investigator in Chemistry.	
HENRY T. FERNALD, Ph.D.,	44 Amity Street.
Professor of Entomology.	
HENRY J. FRANKLIN, Ph.D.,	East Wareham.
Research Professor in charge of Cranberry Substation.	
ARTHUR P. FRENCH, B.Sc.,	10 Hitchcock Street.
Investigator in Pomology.	
GEORGE E. GAGE, Ph.D.,	The Davenport.
Professor of Animal Pathology.	
EDWIN F. GASKILL, M.Sc.,	North Pleasant Street.
Assistant Research Professor of Agriculture.	
HUBERT D. GOODALE, Ph.D.,	North Amherst.
Research Professor of Poultry Husbandry.	

¹ Absent on leave.

JOHN C. GRAHAM, B.Sc.,	68 Lincoln Avenue.
Professor of Poultry Husbandry.	
EDWARD B. HOLLAND, Ph.D.,	28 North Prospect Street.
Research Professor of Chemistry.	
ARAO ITANO, Ph.D.,	3 Fearing Street.
Assistant Professor of Microbiology.	
LORIAN P. JEFFERSON, M.A.,	84 Pleasant Street.
Assistant Research Professor of Agricultural Economics.	
CARLETON P. JONES, M.Sc.,	8 Nutting Avenue.
Assistant Research Professor of Chemistry.	
WEBSTER S. KROUT, M.A.,	17 Fearing Street.
Assistant Research Professor of Botany.	
JOHN B. LENTZ, A.B., V.M.D.,	42 Lincoln Avenue.
Assistant Research Professor of Veterinary Science.	
JOSEPH B. LINDSEY, Ph.D.,	47 Lincoln Avenue.
Vice-Director and Chemist.	
CHARLES E. MARSHALL, Ph.D.,	44 Sunset Avenue.
Professor of Microbiology.	
FRED W. MORSE, M.Sc.,	40 Pleasant Street.
Research Professor of Chemistry.	
A. VINCENT OSMUN, M.Sc.,	16 Northampton Road.
Professor of Botany.	
JOHN E. OSTRANDER, A.M., C.E.,	33 North Prospect Street.
Meteorologist.	
JAMES B. PAIGE, D.V.S.,	42 Lincoln Avenue.
Professor of Veterinary Science.	
FRED C. SEARS, M.Sc.,	Mount Pleasant.
Professor of Pomology.	
JACOB K. SHAW, Ph.D.,	5 Farview Way.
Research Professor of Pomology.	
HAROLD F. TOMPSON, B.Sc.,	10 Temple Street, Arlington.
In charge of Market-garden Field Station.	
ANNA M. WALLACE, M.A.,	79 Pleasant Street.
Curator, Department of Botany.	
FRANK A. WAUGH, M.Sc.,	Campus.
Head of Division of Horticulture.	
HARLAN N. WORTHLEY, B.Sc.,	6 Nutting Avenue.
Investigator in Entomology.	
Research Professor of Botany.	

CONTROL SERVICE STAFF.

ETHEL M. BRADLEY, B.Sc.,	79 Pleasant Street.
Analyst.	
RAY A. CARTER, ¹	Nutting Avenue.
Collector of Blood Samples.	
OLIVER S. FLINT, B.Sc.,	18 Nutting Avenue.
Analyst.	
HENRI D. HASKINS, B.Sc.,	14 Amity Street.
Official Chemist, Fertilizer Control.	
JAMES T. HOWARD,	46 Pleasant Street.
Inspector.	
ANN SMITH,	9 Phillips Street.
Analyst.	
PHILIP H. SMITH, M.Sc.,	102 Main Street.
Official Chemist, Feed Control.	
RAYMOND W. SWIFT, B.Sc.,	North Amherst.
Analyst.	
LEWELL S. WALKER, B.Sc.,	19 Phillips Street.
Assistant Official Chemist, Fertilizer Control.	

¹ Temporary position.

THE EXTENSION SERVICE STAFF.

KENYON L. BUTTERFIELD, A.M., LL.D.,	President's House. President of the College.
JOHN D. WILLARD, B.A.,	31 Lincoln Avenue. Director.
JOHN B. ABBOTT, M.Sc.,	21 Pleasant Street. Extension Professor of Agronomy.
WILLIAM R. COLE,	5 East Pleasant Street. Assistant Extension Professor of Horticultural Manufactures.
GEORGE L. FARLEY, B.Sc.,	61 Amity Street. Supervisor of Junior Extension Work.
CLIFFORD J. FAWCETT, B.Sc.,	7 Woodside Avenue. Extension Professor of Animal Husbandry.
WILLIAM F. HOWE,	21 Pleasant Street. Assistant Supervisor of Junior Extension Work.
LOUIS M. LYONS, B.Sc.,	10½ Kellogg Avenue. Extension Editor and Supervisor of Correspondence Courses.
ALLISTER F. MACDOUGALL, B.Sc.,	North Amherst. Extension Professor of Farm Management.
ROBERT J. McFALL, Ph.D.,	20 Spring Street. Extension Professor of Agricultural Economics.
WILLIAM C. MONAHAN, B.Sc.,	34 Pleasant Street. Extension Professor of Poultry Husbandry.
DOROTHY W. MURDOCK,	87 Pleasant Street. Assistant State Club Leader.
EARLE H. NODINE,	21 Pleasant Street. Extension Instructor in charge of Poultry Club Work.
SUMNER R. PARKER, B.Sc.,	South Amherst. Supervisor of County Agent Projects.
LUCY M. QUEAL, B.Sc.,	8 Kellogg Avenue. Assistant Supervisor, State Home Demonstration Projects.
RALPH W. REDMAN, B.Sc.,	3 Hallock Street. Assistant Director.
MRS. RUTH REED,	Lynn. Assistant Extension Professor of Home Economics.
LUCILE W. REYNOLDS, B.Sc.,	87 Pleasant Street. State Leader of Home Demonstration Agents.
RALPH A. VAN METER, B.Sc.,	7 East Pleasant Street. Extension Professor of Pomology.
JOSEPH F. WHITNEY, B.Sc., M.L.A.,	The Davenport. Assistant Extension Professor of Landscape Gardening.
— — — — —	— — — — —
Supervisor of Extension Schools and Exhibits.	

THE CLERICAL STAFF.

MRS. CHARLOTTE E. ABRAMSON,	89 South Pleasant Street. Stenographer, Treasurer's Office.
MRS. ESTHER W. ARP,	North Amherst. Stenographer, Extension Service.
ELEANOR F. BISHOP,	3 Spaulding Street. Bookkeeper, Treasurer's Office.
JOHN K. BROADFOOT,	130 Pleasant Street. Cashier, Treasurer's Office.
MARY L. BROADFOOT,	130 Pleasant Street. Clerk, Treasurer's Office.
RUTH L. BROWN,	North Amherst. Clerk, Department of Dairying.
GENEVIEVE M. BURRINGTON,	North Amherst. Stenographer, Department of Dairying.
MRS. ETHEL L. CARRIER,	5 Hitchcock Street. Stenographer, Department of Rural Home Life.

IRENE CHANDLER,	Draper Hall.
Stenographer, Department of Animal Husbandry.	
Mrs. LUCIA G. CHURCH,	North Amherst.
Secretary to the Director of the Experiment Station.	
SUSAN L. CLARK,	Northampton.
Stenographer, Extension Service.	
GRACE M. CORBETT,	Draper Hall.
Bookkeeper, Treasurer's Office.	
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Telephone Operator.	
MARGARET G. DAVIDSON,	10 Boltwood Avenue.
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Stenographer, Extension Service.	
ROSE DELANEY,	Draper Hall.
Stenographer, Department of Rural Sociology.	
HAZEL E. DONOVAN,	Draper Hall.
Clerk, Power Plant.	
MARGARET C. EPPLER,	Draper Hall.
Clerk, Experiment Station.	
MARY A. EVANS,	Adams House.
Stenographer, Dean's Office.	
F. ETHEL FELTON, A.B.,	Fearing Street.
Clerk and Editorial Assistant, Experiment Station.	
MARGARET FISH,	43 Fearing Street.
Stenographer, President's Office.	
LINA E. FISHER,	28 Pleasant Street.
Clerk, Department of Chemistry.	
GRACE E. GALLOND,	28 Pleasant Street.
Clerk, Department of Dairying.	
KATHERINE GARDNER, A.B.,	87 Pleasant Street.
Clerk, Division of Agriculture.	
CORA B. GROVER,	North Amherst.
Stenographer, Control Service.	
ELIZABETH HALLOWELL, A.M.,	Draper Hall.
Secretary to the Director of the Graduate School.	
AMY H. HAMILTON,	Savings Bank Block.
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Stenographer, Department of Agronomy.	
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Stenographer, Dean's Office.	
CATHERINE E. HONNEY,	72 Lincoln Avenue.
Stenographer, President's Office.	
EVELYN C. HUBBARD,	24 North Prospect Street.
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ELIZABETH M. KILEY,	Northampton.
Stenographer, Department of Entomology.	
LILLIAN E. LAKE,	Draper Hall.
Stenographer, President's Office.	
MARGUERITE C. LEDUC,	Northampton.
Chief Clerk, Extension Service.	
HONORIA LEE,	38 Cottage Street.
Stenographer, Division of Horticulture.	
HELEN MARTIN,	5 Phillips Street.
Bookkeeper, Treasurer's Office.	
EDITH MEEHAN,	1122 Massachusetts Avenue, Arlington.
Stenographer, Market-garden Field Station.	
MARIE A. MERCIER,	Draper Hall.
Stenographer, Short Courses.	
Mrs. GERTRUDE MILNE,	Draper Hall.
Bookkeeper, Treasurer's Office.	
GLADYS I. MINER,	79 Pleasant Street.
Stenographer, Department of Botany.	

BRIDIE E. O'DONNELL,	Hadley.
Stenographer, Department of Entomology.	
JULIETTA O'DONNELL,	North Amherst.
Stenographer, Registrar's Office.	
CORINNE T. PETIT,	31 East Pleasant Street.
Clerk, Extension Service.	
MILDRED PIERPONT, A.B.,	28 Pleasant Street.
Clerk, Dean's Office.	
MILDRED PUTNEY,	Leverett.
Stenographer, Department of Agricultural Economics.	
HELEN REARDON,	Hadley.
Stenographer, Extension Service.	
JOSEPHINE B. REED,	15 Fearing Street.
Stenographer, Extension Service.	
EDITH C. ROBINSON,	24 North Prospect Street.
Secretary to the President.	
MRS. RUTH L. RODWAYE,	9 Gaylord Street.
Bookkeeper, Treasurer's Office.	
ORA E. ROULEAU,	10 Dickinson Street.
Clerk, Division of Horticulture.	
RUBY SANBORN, A.B.,	45 Pleasant Street.
Clerk, Department of Poultry Husbandry.	
R. ELVERA SCHULER,	Draper Hall.
Stenographer, Short Courses.	
RUTH SHERBURNE, B.Sc.,	87 Pleasant Street.
Stenographer, Department of Agricultural Economics.	
HARRIET A. SMITH,	Northampton.
Clerk, President's Office.	
MRS. RUTH M. SMITH,	"One Acre," Mount Pleasant.
Stenographer, Extension Service.	
ELIZABETH B. STRACHAN,	17 High Street.
Bookkeeper, Treasurer's Office.	
ETHELYN STREETER,	79 Pleasant Street.
Clerk, Division of Horticulture.	
DORIS C. TOWER,	12 East Pleasant Street.
Clerk, Department of Poultry Husbandry.	
MRS. LAURA S. TOWER,	North Amherst.
Stenographer, Department of Poultry Husbandry.	
OLIVE M. TURNER, B.Sc.,	22 Spaulding Street.
Clerk, Registrar's Office.	
CATHERINE H. WHITE,	50 Mount Pleasant.
Stenographer, Extension Service.	
— — — — —	— — — — —
Clerk, Extension Service.	
— — — — —	— — — — —
Secretary, Division of Rural Social Science.	
— — — — —	— — — — —
Stenographer, Extension Service.	

THE LIBRARY STAFF.

HENRY S. GREEN, A.B., LL.D.,	Mount Pleasant.
Librarian.	
ETHEL A. GREEN, A.M.,	Mount Pleasant.
Library Assistant.	
MARGERY BURNETT,	12 East Pleasant Street.
Department Librarian.	
LENA V. CHAPMAN,	77 South Pleasant Street.
Assistant in charge of circulation.	
FLORENCE B. KIMBALL, A.B.,	87 Pleasant Street.
Cataloguer.	
FRANCES POWERS,	44 Lincoln Avenue.
Stenographer.	

OTHER OFFICERS.

THOMAS F. BUTTERWORTH, Engineer.	3 Phillips Street.
GRACE CHARMAN, Resident Nurse.	Infirmary.
MARGUERITE DAVIS, Resident Nurse.	Infirmary.
LAWRENCE S. DICKINSON, B.Sc., Superintendent of Grounds.	2 Farview Way.
LULU DIETHER, Manager of the Dining Hall.	Draper Hall.
SAMUEL C. HUBBARD, Foreman, Department of Floriculture.	183 South Pleasant Street.
CLARENCE A. JEWETT, Superintendent of Buildings.	112 Pleasant Street.
JOHN J. LEE, Assistant to the Military Detail.	38 Cottage Street.
WILLIAM E. MARTIN, Laboratory Assistant, Department of Horticultural Manufactures.	5 Phillips Street.
ENOS J. MONTAGUE, B.Sc., Farm Superintendent.	Campus.
ADELBERT SHEFFIELD, Superintendent of Dairy Manufactures.	North Amherst.
Mrs. MARIE E. WHITE, Matron.	Abigail Adams House.

GRADUATE ASSISTANTS.

RICHARD J. DREXEL, B.Sc.Agr., Department of Pomology.	Eames Street.
MILDRED E. EDWARDS, B.Sc., Department of Microbiology.	The Davenport.
RENZY E. FLIKKEMA, A.B., Department of Chemistry.	Chemistry Building.
ROWLAND B. FRENCH, B.Sc., Department of Chemistry.	Chemistry Building.
GERALD M. GILLIGAN, B.Sc., Department of Chemistry.	77 Pleasant Street.
ADONIS L. GRAY, B.Sc.Agr., Department of Agronomy.	7 East Pleasant Street.
WILLIAM C. KING, B.Sc.Agr., Department of Landscape Gardening.	50 Pleasant Street.
NEWTON E. LINCOLN, B.Sc., Department of Poultry Husbandry.	81 Pleasant Street.
JOHN G. MCCRIMMON, B.Sc.Agr., Department of Microbiology.	53 Lincoln Avenue.
DAVID POTTER, B.Sc., Department of Botany.	Clark Hall.
LAWRENCE F. PRATT, B.Sc., Department of Chemistry.	Q. T. V. House.
J. RAYMOND SANBORN, B.Sc., Department of Microbiology.	North Amherst.
HARRISON M. TIETZ, B.Sc., Department of Entomology.	6 Nutting Avenue.
HERBERT L. VONMECHOW, B.Sc., Department of Agronomy.	East Pleasant Street.
HERBERT W. YOUNT, B.Sc.Agr., Department of Agricultural Economics.	9 Fearing Street.

STANDING COMMITTEES OF THE FACULTY.

1921-22.

COMMENCEMENT.

Dean LEWIS.
 Treasurer KENNEY.
 Secretary WATTS.
 Mr. S. R. PARKER.
 Professor THAYER.
 Mr. REDMAN.

COURSE OF STUDY.

President BUTTERFIELD.
 Dean LEWIS.
 Professor HART.
 Professor WAUGH.
 Professor PATTERSON.
 Professor FERNALD.
 Professor OSTRANDER.
 Professor MARSHALL.
 Professor CHAMBERLAIN.
 Professor PHELAN.
 Professor FOORD.

DISCIPLINE.

Dean LEWIS.
 Professor MACHMER.
 Professor PHELAN.
 Professor CHENOWETH.
 Professor HICKS.

EMPLOYMENT.

Professor JUDKINS.
 Treasurer KENNEY.
 Secretary WATTS.
 Professor THAYER.

NON-ATHLETIC BOARD.

Professor MACHMER.
 Assistant Professor GOULD.

ENTRANCE EXAMINATIONS AND ADMISSION..

Professor HASBROUCK.
 Professor PATTERSON.
 Professor OSMUN.
 Professor ASHLEY.
 Professor MACHMER.

HEALTH AND SANITATION.

Professor MARSHALL.
 Dean LEWIS.
 Treasurer KENNEY.
 Professor HICKS.
 Miss SKINNER.

LIBRARY.

Professor MARSHALL.
 Professor PATTERSON.
 Professor CANCE.
 Mr. GREEN.

SCHOLARSHIP.

Professor MACHMER.
 Dean LEWIS.
 Professor HASBROUCK.
 Assistant Professor RAND.
 Professor MACKIMMIE.
 Professor PATTERSON.
 Assistant Professor PARKER.
 Professor HICKS.
 Assistant Professor TORREY..

STUDENT LIFE.

Professor PATTERSON.
 Secretary WATTS.
 Professor PHELAN.
 Professor SEARS.
 Professor CHAMBERLAIN.
 Professor THAYER.

ATHLETIC BOARD.

Dean LEWIS.
 Professor HASBROUCK.
 Professor OSMUN.

THE COLLEGE

ADMISSION.

A. APPLICATION FOR ADMISSION.

Correspondence concerning admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of character, which, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege at least one month before the date of the examination. Blanks for such application may be obtained by addressing the registrar of the college. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

B. MODES OF ADMISSION.

Students are admitted to the freshman class either upon certificate or upon examination. No *diploma* from a secondary school will be accepted.

CERTIFICATES. — Certificates will be received from those schools in New England which have been approved by the New England College Entrance Certificate Board. Principals of schools in New England who desire the certificate privilege should address the secretary of the Board, Professor Frank W. Nicolson, Wesleyan University, Middletown, Conn. Certificates from schools outside of New England may be received if those schools are on the approved list of the leading colleges of the section in which the school in question is located.

The credentials of the Board of Regents of the State of New York are accepted as satisfying the entrance requirements of this college when offered subject for subject.

Certificates in order to be accepted must present in the prescribed and restrictive elective groups at least three of the necessary fourteen and one-half credits. It is to be understood, however, that responsibility for certification in either elementary French, elementary German, English 1 or English 2, Latin A, Greek A or algebra must be assumed by one school, if the candidate has received his preparation in any one subject named above in more than one school. Subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

EXAMINATIONS. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.

Entrance examination for admission to the Massachusetts Agricultural College will be held at the following centers:—

In June, Amherst, Department of Physics building.
Massachusetts Institute of Technology,
Cambridge, Mass.
Worcester, Horticultural Hall.

In September, Amherst, Department of Physics building.

Please note that September examinations are held in Amherst only.

Schedule for Entrance Examinations, June 29–July 1, inclusive, 1922.—
The examinations in June will follow this schedule:—

First Day.

7.45 A.M. Registration.¹
8.00 A.M. Plane geometry.
10.00 A.M. Chemistry.
11.30 A.M. Botany.
2.00 P.M. Solid geometry.
4.00 P.M. Physics.

Second Day.

8.00 A.M. English 1 and 2.
11.00 A.M. Algebra.
2.00 P.M. History (ancient; medieval and modern; English; general; United States and civics).

Third Day.

8.00 A.M. French, German, Spanish, required and elective.
1.00 P.M. Latin, elementary, intermediate and advanced, and all one-half credit electives, except those already noted.

Schedule for Entrance Examinations in September.—In September, 1922, the examinations will be given September 20–23, inclusive, and will follow the order indicated below:—

First Day.

1.00 P.M. Registration.¹
1.15–5.00 P.M. Greek, elementary and intermediate.

Second Day.

8.00 A.M. Plane geometry.
10.00 A.M. Chemistry.
11.30 A.M. Botany.
2.00 P.M. Solid geometry.
4.00 P.M. Physics.

Third Day.

8.00 A.M. English 1 and 2.
11.00 A.M. Algebra.
2.00 P.M. History (ancient; medieval and modern; English; general; United States and civics).

¹ Candidates who have no examination at the time set for registration may register at the time of their first examination should they so desire.

Fourth Day.

8.00 A.M. French, German, Spanish, required and elective.

1.00 P.M. Latin, elementary, intermediate and advanced, and all one-half credit electives, except those already noted.

C. REQUIREMENTS FOR ADMISSION.

The requirements for admission are based on the completion of a four-year high school course, or its equivalent, and are stated in terms of units. The term unit means the equivalent of at least four recitations a week for a school year.

Fourteen and one-half units must be offered for admission in accordance with the entrance requirements as stated below. Entrance credits gained either by certificate or by examination will hold good for one year.

Entrance Requirements.

1. *Prescribed.* — The following units are prescribed: —

English 1,	1½
English 2,	1½
A foreign language,	2
Algebra,	1½
Plane geometry,	1
	<hr/>
	7½

2. *Restricted Electives.* — Three units to be selected from —

Science,	1, 2 or 3
History (American history and civics included),	1, 2 or 3
A second foreign language,	2 or 3
Additional work in first foreign language,	1 or 2.

3. *Free Margin.* — Free margin of four units to consist of any substantial work (including agriculture,¹ general science and a fourth year of English) for which credit of not less than one-half unit earned in one year is given toward a secondary school diploma.

Units presented in the free margin group are not to be offered by examination or by certificate, but presented by submitting a principal's statement to the effect that such units have been earned in a secondary school, and have been credited toward a diploma issued by such a school.

4. One unit of history must be offered in either the restricted electives or the free margin.

5. If elementary algebra and plane geometry are counted as three units, the total requirement will be fifteen units.

6. Both the credits under the prescribed group and the restricted elective group must be presented either by certificate from an approved school or by examination, or by a combination of both.

The following is a list of subjects in which the entrance credits must be offered in the prescribed and restricted elective groups: —

¹ See page 32 for details.

Mathematics and Science.

Botany, ¹	. . . . .	½ or 1
Chemistry, ¹	. . . . .	1
Algebra,	. . . . .	1½
Plane geometry,	. . . . .	1
Solid geometry,	. . . . .	½
Trigonometry,	. . . . .	½
Physics, ¹	. . . . .	1
Geology,	. . . . .	½
Physical geography,	. . . . .	½
Physiology,	. . . . .	½
Zoölogy, ¹	. . . . .	½

History.

Ancient,	. . . . .	1
Medieval and modern,	. . . . .	1
English,	. . . . .	1
General,	. . . . .	1
United States and civics,	. . . . .	1

English.

English 1,	1½
English 2,	. . . . .	1½

Foreign Language.

Elementary French,	. . . . .	2
Elementary German,	. . . . .	2
Elementary Spanish,	. . . . .	2
Elementary Latin,	. . . . .	2
Elementary Greek, ²	. . . . .	2
Intermediate French,	. . . . .	1
Intermediate German,	. . . . .	1
Intermediate Spanish,	. . . . .	1
Intermediate Latin,	. . . . .	1
Intermediate Greek, ²	. . . . .	1
Advanced French,	. . . . .	1
Advanced German,	. . . . .	1
Advanced Spanish,	. . . . .	1
Advanced Latin,	. . . . .	1

No applicant deficient in both algebra and plane geometry will be admitted.

PRESENTATION OF NOTE-BOOKS. — The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 1, below).

Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificates should not present note-books; but their certificates must state that note-books have been satisfactorily completed.

D. STATEMENT OF PREPARATION REQUIRED FOR ADMISSION.

AGRICULTURE. — Entrance credit in agriculture is granted on the following basis: —

I. The Massachusetts Agricultural College accepts a maximum of four credits in agriculture from any secondary or county agricultural high school in Massachusetts offering work in that subject, provided evidence of such

¹ Note-book required as part of the preparation will be credited as part of the examination

² Examination in September only.

work having been done is submitted on a principal's statement, as is indicated in the "free margin" group.

II. In high schools organizing agricultural club work under the supervision and rules of the junior extension service of the college, one credit is granted for each full year of work performed under the following plan: —

Work of the Winter Term. — (a) The study of textbooks such as are suitable for secondary school instruction in agriculture.

(b) Course of Study: A general outline of suggested topics for study.

(c) Visits by a representative of the Massachusetts Agricultural College for observation, counsel and advice in regard to kind and amount of work being done in agriculture.

(d) Formation of an agricultural club with officers from among its own members, meeting once a month under local supervision of some one authorized to act for the school authorities.

Work of the Spring Term. — Same in general form as winter term.

Work of the Summer Term. — An approved project conforming to the rules of some one or more of the agricultural clubs of the junior extension service of the Massachusetts Agricultural College.

Work of the Fall Term. — (a) An exhibit of work.

(b) Reports and story of achievement submitted to the junior extension service of the college.

The maximum number of credits in agriculture is four.

BOTANY. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Stevens' "Introduction to Botany" and Bergen & Davis' "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit, and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

CHEMISTRY. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from any standard textbook, with laboratory work on the properties of the common elements and their simpler compounds. No particular work is prescribed. The keeping of a note-book is required.

MATHEMATICS. — (a) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations;

the binominal theorem for positive integral exponents, the formulas for the n th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good textbooks, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(b) *Elective.* — **Solid Geometry:** The usual theorems and constructions of good textbooks, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

PHYSICS. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work must consist of both class-room work and laboratory practice. The work covered in the class-room should be equal to that outlined in Hall & Bergen's "Textbook of Physics" or Millikan & Gale; the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

PHYSIOLOGY. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body; Briefer Course."

ZOOLOGY, PHYSICAL GEOGRAPHY, GEOLOGY. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis' "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, textbooks entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Textbook in General Zoölogy." For geology, A. P. Brigham's "A Textbook of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present note-books, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

HISTORY. — The required unit must be offered in either ancient history, medieval and modern history, English history, general history, or United

States history and civics. Either one, two or three elective units in any of the historical subjects here named may be offered, provided that no unit be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good textbooks, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on outline maps.

To indicate in a general way the character of the text-book work expected, the texts of the following authors are suggested: Botsford, Morey or Myers, in ancient history (to 814 A.D.); Adams, West or Myers, in medieval history; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery, in United States history and civics.

ENGLISH. — The study of English in school has two main objects, which should be considered of equal importance: (1) command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence and appreciation, and the development of the habit of reading good literature with enjoyment.

(1) *Grammar and Composition* (One and One-half Units). — The first object requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, sentences and paragraphs should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise letter-writing, narration, description and easy exposition and argument. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

(2) *Literature* (One and One-half Units). — The second object is sought by means of two lists of books, headed, respectively, "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud and encouraged to commit to memory some of the more notable passages both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads and with their place in literary history.

A. *Books for Reading*. — The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

The books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except that for any book in Group I. a book from any other may be substituted.

GROUP I. CLASSICS IN TRANSLATION.

The "Old Testament," at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther.
 The "Odyssey," with the omission, if desired, of Books I-V, XV and XVI.
 The "Æneid."
 The "Odyssey" and the "Æneid" should be read in English translations of recognized literary excellence.

GROUP II. DRAMA.

Shakespeare: "Merchant of Venice," "As You Like It," "Julius Cæsar."

GROUP III. PROSE FICTION.

Dickens: "A Tale of Two Cities."
 George Eliot: "Silas Marner."
 Scott: "Quentin Durward."
 Hawthorne: "The House of the Seven Gables."

GROUP IV. ESSAYS, BIOGRAPHY, ETC.

Addison and Steele: "The Sir Roger de Coverley Papers."
 Irving: "The Sketch Book," selections covering about 175 pages.
 Macaulay: "Lord Clive."
 Parkman: "The Oregon Trail."

GROUP V. POETRY.

Tennyson: "The Coming of Arthur," "Gareth and Lynette," "Lancelot and Elaine," "The Passing of Arthur."
 Browning: "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Herve Riel," "Pheidippides," "My Last Duchess," "Up at a Villa—Down in the City," "The Italian in England," "The Patriot," "The Pied Piper," "De Gustibus," "Instans Tyrannus."
 Scott: "The Lady of the Lake."
 Coleridge: "The Ancient Mariner."
 Arnold: "Sohrab and Rustum."

B. Books for Study.—This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. The books provided for study are arranged in four groups, from each of which one selection is to be made.

The books provided for study are arranged in four groups, from each of which one selection is to be made.

GROUP I. DRAMA.

Shakespeare: "Macbeth," "Hamlet."

GROUP II. POETRY.

Milton: "L'Allegro," "Il Penseroso," "Comus."
 Book IV of Palgrave's "Golden Treasury" (first series), with special attention to Wordsworth, Keats and Shelley.

GROUP III. ORATORY.

Burke: "Speech on Conciliation with America."

Washington's "Farewell Address," Webster's "First Bunker Hill Oration," and Lincoln's "Gettysburg Address."

GROUP IV. ESSAYS.

Macaulay: "Life of Johnson."

Carlyle: "Essay on Burns," with a brief selection from Burns' poems.

Examination. — However accurate in subject-matter, no paper will be considered satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which will be on grammar and composition, and the other on literature.

In grammar and composition, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors. The main test in composition will consist of one or more essays, developing a theme through several paragraphs; the subjects will be drawn from the books read, from the candidate's other studies and from his personal knowledge and experience quite apart from reading.

The examination in literature will include: —

(a) General questions designed to test such a knowledge and appreciation of literature as may be gained by fulfilling the requirements defined under "A, Reading," above.

(b) A test on the books prescribed for study, which will consist of questions upon their content and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their works and the periods of literary history to which they belong.

FRENCH. — Elementary: The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a third credit unit in French as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in French will be given unless the candidate has presented elementary French on certificate, or has written the examination in elementary French.

No examination for a fourth credit in French will be given unless the candidate has presented both elementary and intermediate French upon certificate, or has written the examination in both elementary and intermediate French.

GERMAN. — Elementary: The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-year requirements).

Third and fourth year German (elective subjects for admission). — For a third credit unit in German as an elective subject for entrance, when required units have been offered in German, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in German will be given unless the candidate has presented elementary German upon certificate, or has written the examination in elementary German.

No examination for a fourth credit in German will be given unless the candidate has presented both elementary and intermediate German upon certificate, or has written the examination for both elementary and intermediate German.

SPANISH. — *Elementary*: The necessary preparation for this examination is stated in the description of the two-year course in elementary Spanish recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year Spanish (elective subjects for admission). — For a third credit unit in Spanish as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in Spanish will be given unless the candidate has presented elementary Spanish on certificate, or has written the examination in elementary Spanish.

No examination for a fourth credit in Spanish will be given unless the candidate has presented both elementary and intermediate Spanish upon certificate, or has written the examination in both elementary and intermediate Spanish.

GREEK. — *Elementary*. — Greek grammar and composition: Translation into Greek of short sentences illustrating common principles of syntax.

The examination in grammar and prose composition will be based on the first four books of Xenophon's "Anabasis."

Intermediate. — Homer's "Iliad," Books I and II (omitting Book II, 494 to end), and the Homeric forms, constructions, idioms and prosody.

Prose composition, consisting of continuous prose based on Xenophon, and other Attic prose of similar difficulty.

Translation of passages of Homer at sight.

The examinations in Greek, elementary and intermediate, will be given in September only.

LATIN. — *Elementary*. — Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (a) the translation of a passage or passages taken from Cæsar's "Gallic War," covering at least four books, and (b) the translation of passages of Latin prose at sight.

Intermediate. — Cicero (third oration "Against Catiline" and the orations "For Archias" and "For Marcellus") and sight translation of prose.

Advanced. — Vergil (Æneid, II, III and VI) and sight translation of poetry.

E. ADMISSION TO ADVANCED STANDING.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this require-

ment, a student transferring to this college from another college or university of recognized standing must present the following credentials:—

1. A letter of honorable dismissal from the institution with which he has been connected.

2. A statement or certificate of his entrance record.

3. A statement from the proper officer showing a complete record of his work while in attendance.

4. A marked catalogue showing the courses pursued.

5. A statement from the proper officer, giving the total number of credits required for graduation by the institution from which the applicant is transferring, and, of this total, the number that the applicant has satisfactorily completed at the time of transfer.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

F. OTHER INFORMATION ABOUT ENTRANCE.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)

2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.

3. To matriculate, candidates must offer twelve and one-half of the fourteen and one-half units required for admission, and will be conditioned in those subjects not passed. At least five and one-half credits must be in the prescribed group. No candidate deficient in both algebra and plane geometry will be admitted.

4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination during the first week of the second term. (2) Second entrance condition examination before the beginning of the period of final examinations of the second term, upon the payment of a fee of \$5 to the treasurer.

5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.

6. Examinations in part of the subjects required for entrance may be taken one year before entering college.

7. For information concerning expenses, scholarships, etc., see "General Information."

8. For information concerning admission to short courses, see "Short Courses."

9. Application for admission as a "Special Student" should be made to the Dean.

COURSES OF INSTRUCTION.

TABLE OF FRESHMAN AND SOPHOMORE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

FRESHMAN YEAR.

FIRST TERM.

All work required.

SUBJECT.	Courses and Numbers.	Credit Hours per Week.
Chemistry,	Chemistry 1 or 4,	3
Algebra,	Mathematics 1,	5
Language,	French or German 1 or 4,	3
English,	English 1,	3
Agriculture,	Agronomy 1, Horticulture 1,	3
Military (for men),	Military 1,	3
Microbiology (for women),	Microbiology 1,	3
Hygiene,	Physical Education 1,	1
Public speaking,	Public Speaking 1 (one-third of the class),	1

College life (attendance without credit).

SECOND TERM.

Chemistry,	Chemistry 2 or 5,	3
Algebra,	Mathematics 2,	2
Trigonometry,	Mathematics 5,	3
Language,	French or German 2 or 5,	3
English,	English 2,	3
Agriculture,	Poultry 1, Animal Husbandry 1,	3
Military (for men),	Military 2,	3
Geology (for men),	Geology 2,	2
Rural home life (for women),	Rural Home Life 2,	2
Public speaking,	Public Speaking 1 (one-third of class),	1

College life (attendance without credit).

FRESHMAN YEAR — *Concluded.*

THIRD TERM.

SUBJECT.	Courses and Numbers.	Credit Hours per Week.
Chemistry,	Chemistry 3 or 6,	3
Solid geometry,	Mathematics 3,	3
Mensuration (for men), . .	Mathematics 6,	2
Language,	French or German 3 or 6,	3
English,	English 3,	3
Botany,	Botany 3,	3
Military (for men),	Military 3,	3
Microbiology (for women), .	Microbiology 3,	2
Rural home life (for women), .	Rural Home Life 3,	3
Recreation,	Physical Education 3,	1
Public speaking,	Public Speaking 1 (one-third of class),	1

College life (attendance without credit).

SOPHOMORE YEAR.

FIRST TERM.

SUBJECT.	Course Number.	Class Hours.	Two Hour Laboratory Periods.	Credit Hours per Week.
<i>Required.</i>				
Physics,	25	3	1	4
Zoölogy,	25	2	2	4
Botany,	25	1	2	3
English,	25	2	-	2
Military (for men),	25	1	2	3
Microbiology (for women),	25	2	-	2
Total required,	-	-	-	17
<i>Elective.</i>				
Chemistry,	25	1	2	3
French,	25 or 28	3	-	3
German,	25 or 28	3	-	3
Drawing,	25	-	3	3
Animal husbandry,	25	2	1	3
Rural engineering,	25	-	2	2
Rural home life,	25	1	2	3

Minimum credit for first term, 18.

Maximum credit for first term, 21.

SECOND TERM.

<i>Required.</i>				
Physics,	26	2	1	3
Agricultural economics,	26	5	-	5
English,	26	2	-	2
Military (for men),	26	1	2	3
Total required,	-	-	-	12
<i>Elective.</i>				
Chemistry,	26	1	2	3
French,	26 or 29	3	-	3
German,	26 or 29	3	-	3
Mathematics,	26	2	-	2
Drawing,	26	-	3	3
Entomology,	26	3	-	3
Animal husbandry,	26	2	1	3
Rural engineering,	26	-	2	2
Botany,	26	1	2	3
Economic sociology,	26	5	-	5
Rural home life (for women),	26	1	2	3

Minimum credit for second term, 18.

Maximum credit for second term, 20.

SOPHOMORE YEAR — *Concluded.*

THIRD TERM.

SUBJECT.	Course Number.	Class Hours.	Two Hour Laboratory Periods.	Credit Hours per Week.
<i>Required.</i>				
Rural sociology,	27	3	—	3
Agronomy,	27	4	1	5
English,	27	2	—	2
Military (for men),	27	1	2	3
Microbiology (for women),	27	2	—	2
Physical education, ¹	26	—	1	1
Total required,	—	—	—	15
<i>Elective.</i>				
Botany,	27	1	2	3
Chemistry,	27	1	4	5
Chemistry,	6	3	2	5
French,	27 or 30	3	—	3
German,	27 or 30	3	—	3
Mathematics,	27	—	3	3
Drawing,	27	—	3	3
Entomology,	27	—	2	2
Geology,	27	3	2	5
Physics,	27	4	1	5
Horticulture,	27	2	1	3
Zoölogy,	27	1	2	3
Rural home life (for women),	27	1	2	3

Minimum credit for third term, 19.

Maximum credit for third term, 22.

¹ Credit for Physical Education 2 and 3 given in third term.

MAJORS: JUNIOR AND SENIOR YEARS.

GENERAL STATEMENT.

A major consists of 45 credit hours of correlated work, which is arranged by the student and his adviser.

The list of courses found under each major on subsequent pages should not be considered as necessarily a rigid program to be followed. The heads of departments have suggested this series of courses as the best for the average man majoring in their departments. Advisers may, however, make modifications to suit the particular needs of the student, provided these modifications conform precisely to the class schedule as published for the year.

RULES GOVERNING MAJORS.

RULE 1. *Election.* — Each student, before the first term of his junior year, shall elect a major subject from the list of majors given below; and this major shall consist of 45 credit hours of correlated work.

RULE 2. *Minimum Credits.* — The minimum number of credits for graduation shall be 237 credit hours, inclusive of military drill and physical education.

RULE 3. *Maximum Credits.* — The maximum number of credits for any term of the junior or senior year shall be 22; the minimum shall be 19.

RULE 4. *Humanities and Rural Social Science.* — A minimum of 18 credit hours in the Divisions of the Humanities and Rural Social Science will be required of all students during their junior and senior years, with the following restriction: that a minimum of 5 credit hours will be required in each of the divisions.

RULE 5. *Advisers.* — The work of each junior and senior will be under the immediate supervision of an instructor designated as major adviser. Ordinarily, the major adviser will be the head of the department in which the student elects his major. The adviser has full authority to prescribe the student's work up to 45 hours. He will, however, so far as practicable, recognize the individual needs of the student. It is also expected that students will seek the counsel of the adviser with respect to the remaining courses required for graduation.

RULE 6. *Free Electives.* — Each student during his junior and senior years is required to take 45 hours in his major and also 18 hours in the Divisions of the Humanities and Rural Social Science, making a total of 63 hours (but see Rule 4). He is allowed free choice of courses to complete his required hours.

RULE 7. *Registration.* — No junior or senior shall register until his major course of study is approved by his adviser.

(1) Course cards for recording the election of majors will be issued from the registrar's office three weeks before the close of each term.

(2) This card must be submitted by each student to his major adviser, who will lay out the course for the succeeding term and countersign the card.

(3) Each course card must be filled out, giving the name of student, his college address, the name of parent or guardian, and the student's home address. When the major courses have been entered on this card, and the hours

of free elections added by the student, the card must be returned to the registrar one week before the beginning of the final examination period.

RULE 8. *Changes.* — Applications for changes may be made to the dean in writing at any time; when approved by him and by the committee on scholarship, they become operative at the beginning of the term following, provided that no change in the selection of a major may be made by any student after registration day of his senior year.

AGRONOMY. (Major.)

Professor ARTHUR B. BEAUMONT, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy,	50 I.	5	I.	Chemistry 25,	3	Agronomy 50,	5	Agronomy 75,	5
Agronomy,	51 III.	3		German 25 or 28,	3	Chemistry 51,	8	Farm Management 76,	3
Agronomy,	75 I.	5				Animal Husbandry 50,	3		
Agronomy,	77 II.	5	II.	Botany 26,	3	Chemistry 52,	8	Agronomy 77,	5
Animal Husbandry,	50 I.	3		Chemistry 26,	3				
Chemistry,	51 I.	8		German 26 or 29,	3				
				Mathematics 26,	2				
Chemistry,	52 II.	8	III.	German 27 or 30,	3	Agronomy 51,	3	Farm Management 77,	3
Farm Management,	76 I.	3		Mathematics 27,	3				
Farm Management,	77 III.	3		Geology 27,	5				
		43	IV.						

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Chemistry 25 and 26, German 25 or 28, 26 or 29, 27 or 30, Geology 27, Botany 26.
 ADVISED. — Mathematics 26 and 27.

ANIMAL HUSBANDRY. (Major.)

Professor S. M. SALISBURY, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomora.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy,	50 I.	5	I.	Animal Husbandry 25, . . . . .	. 3	Animal Husbandry 50, . . . . .	. 3	Animal Husbandry 75, . . . . .	. 3
Animal Husbandry,	51 II.	3				Agronomy 50, . . . . .	. 5	Farm Management 75, . . . . .	. 3
Animal Husbandry,	50 I.	3				Veterinary 50, . . . . .	. 5	Farm Management 76, . . . . .	. 3
						Dairying 50, . . . . .	. 5		
Animal Husbandry,	52 III.	3	II.	Animal Husbandry 26, . . . . .	. 3	Animal Husbandry 51, . . . . .	. 3	Animal Husbandry 78, . . . . .	. 3
Animal Husbandry,	75 I.	3							
Animal Husbandry,	53 III.	3	III.			Animal Husbandry 52, . . . . .	. 3	Animal Husbandry 79, . . . . .	. 3
Animal Husbandry,	78 II.	3		Chemistry 6, . . . . .	. 3	Animal Husbandry 53, . . . . .	. 3		
Animal Husbandry,	79 III.	3							
Dairying,	50 I.	5	IV.						
Farm Management,	75 I.	3							
Farm Management,	76 I.	3							
Veterinary,	50 I.	5							
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SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Animal Husbandry 25 and 26, Chemistry 30.
 ADDITIONAL INFORMATION. — The balance of the sophomore electives allowed are left to the student to choose.

DAIRYING. (Major.)
Professor WILLIAM P. B. LOCKWOOD, Adviser.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Animal Husbandry,	52 III.	3	I.	Animal Husbandry 25, . 3		Dairying 50, 5		Microbiology 82, . . 5	
Animal Husbandry,	50 I.	3		Rural Engineering 25, . 2		Microbiology 50, . . 5		Farm Management 75, . 3	
Animal Husbandry,	51 II.	3				Animal Husbandry 50, . 3			
Dairying,	50 I.	5	II.	Animal Husbandry 25, . 3		Animal Husbandry 51, . 3		Dairying 75, 5	
Dairying,	52 III.	1		Rural Engineering 26, . 2		Microbiology 51, . . 5		Dairying 81, 1	
Dairying,	51 III.	5							
Dairying,	75 II.	5							
Dairying,	76 III.	5	III.	Chemistry 6, 3		Animal Husbandry 52, . 3		Dairying 76, 5	
Dairying,	81 II.	1				Dairying 51, 5		Dairying 82, 1	
Dairying,	82 III.	1				Dairying 52, 1			
Farm Management,	75 I.	3				Rural Engineering 52, . 5			
Microbiology,	50 I.	5							
Microbiology,	82 I.	5							
Microbiology,	51 II.	5							
Rural Engineering,	52 III.	5	IV.						
		55							

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Animal Husbandry 25 and 26, Rural Engineering 25 and 26, Chemistry 30.
 ADDITIONAL INFORMATION. — The balance of the sophomore electives allowed are left to the student to choose.

FARM MANAGEMENT. (Major.)

Professor JAMES A. FOORD, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agonomy.	50 I.	5	I.	Animal Husbandry 25,	3	Agonomy 50,	5	Rural Engineering 75,	5
Animal Husbandry.	53 III.	3		Rural Engineering 25,	2	Dairying 50 (or 77),	5	Farm Management 75,	3
						Animal Husbandry 50,	3	Farm Management 76,	3
Animal Husbandry.	50 I.	3	II.	Animal Husbandry 26,	3	Animal Husbandry 51,	3	Farm Management 78,	1
Animal Husbandry.	51 II.	3		Rural Engineering 26,	2				
Dairying.	50 I.	5							
Farm Management.	75 I.	3	III.	Chemistry 30,	5	Microbiology 50,	5	Farm Management 77,	3
Farm Management.	76 I.	3		Horticulture 27,	3	Animal Husbandry 53,	3	Farm Management 79,	1
Farm Management.	77 III.	3						Rural Engineering 78,	3
Farm Management.	78 II.	1						Rural Engineering 79,	5
Farm Management.	79 III.	1							
Microbiology.	50 I.								
or									
Microbiology.	50 III.	5	IV.						
Rural Engineering.	75 I.	5							
Rural Engineering.	76 I.	3							
Rural Engineering.	79 III.	5							
		48							

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Animal Husbandry 25 and 26, Rural Engineering (shop work) 25 and 26, Chemistry 30 or Chemistry 6, Freshman, and Horticulture 27.

ADDITIONAL INFORMATION. — Botany 26, Drawing 26, Entomology 26 and 27, Dairying 75, Pomology 50, 51, 52 and 78, and Veterinary 51, 75 and 78 are suggested as additional courses for the student fitting himself for general agriculture.

POULTRY HUSBANDRY. (Major.)

Professor JOHN C. GRAHAM, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

COURSE.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Animal Husbandry,	53 III.	3	I.			Poultry 50, . . . . .	. 3	Poultry 76, . . . . .	. 5
Poultry Husbandry,	50 I.	3				Poultry 51, . . . . .	. 2	Poultry 77, . . . . .	. 5
						Pomology 50, . . . . .	. 3		
Poultry Husbandry,	51 I.	2	II.			Poultry 52, . . . . .	. 3	Poultry 75, . . . . .	. 5
Poultry Husbandry,	52 II.	3						Veterinary 86, . . . . .	. 3
Poultry Husbandry,	53 III.	5						Poultry 55, . . . . .	. 1-5
Poultry Husbandry,	55	1-5							
Poultry Husbandry,	54 III.	2	III.			Poultry 53, . . . . .	. 5		
Poultry Husbandry,	75 II.	5				Poultry 54, . . . . .	. 2		
Poultry Husbandry,	76 I.	5				Animal Husbandry 53, . . . . .	. 3		
Agricultural Economics,	53 III.	5				Agricultural Economics 53, 5			
Poultry Husbandry,	77 I.	5	IV.						
Pomology,	50 I.	3							
Veterinary Science,	86 II.	3							
		45-49							

SOPHOMORE RECOMMENDATIONS. — Students intending to major in Poultry Husbandry are urged to take Zoology 27. ADVISED. — Juniors who did not take Zoology 27 as sophomores are strongly advised to include it in their program.

FLORICULTURE.
Professor CLARK L. THAYER, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

COURSE.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany,	50 I.	2	I.	Drawing 25,	. . . . . 3	Floriculture 50, . . . . .	. . . . . 4	Floriculture 75, . . . . .	. . . . . 3
Botany,	51 II.	2				Floriculture 53, . . . . .	. . . . . 3	Horticulture 50, . . . . .	. . . . . 5
Entomology,	26 II.	3				Botany 50, . . . . .	. . . . . 2		
Floriculture,	50 I.	4	II.	Drawing 26,	. . . . . 3	Floriculture 51, . . . . .	. . . . . 4	Floriculture 77, . . . . .	. . . . . 3
Floriculture,	51 II.	4		Entomology 26,	. . . . . 3	Floriculture 54, . . . . .	. . . . . 3	Floriculture 76, . . . . .	. . . . . 3
Floriculture,	52 III.	4		Botany 26,	. . . . . 3	Entomology 26, . . . . .	. . . . . 3		
				Botany 51,	. . . . . 2	Botany 51, . . . . .	. . . . . 2		
Floriculture,	53 I.	3	III.	Drawing 27,	. . . . . 3	Floriculture 52, . . . . .	. . . . . 4	Floriculture 79, . . . . .	. . . . . 3
Floriculture,	54 II.	3		Entomology 27,	. . . . . 2	Floriculture 78, . . . . .	. . . . . 3	Floriculture 80, . . . . .	. . . . . 3
Floriculture,	75 I.	3		Horticulture 27,	. . . . . 3			Horticulture 51, . . . . .	. . . . . 5
Floriculture,	76 II.	3							
Floriculture,	77 II.	3	IV.						
Floriculture,	78 III.	3							
Floriculture,	79 III.	3							
Floriculture,	80 III.	3							
Horticulture,	50 I.	5							
Horticulture,	51 III.	5							
		53							

SOPHOMORE ELECTIVE PREREQUISITES. — Drawing 25, 26 and 27, Entomology 26 and 27, Botany 26 and Horticulture 27.

ADDITIONAL INFORMATION. — The rest of the sophomore electives allowed are left to the student to choose. Horticulture 50 and 51 will be taken by seniors. ADVISED. — The department advises all students who major in this subject to take Botany 78, Entomology 50 and Landscape Gardening 75.

FORESTRY. (Major.)
Professor LAWRENCE R. GROSE, Adviser.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany,	50 I.	2	I.	Drawing 25, . . . . .	. . . . . 3	Forestry 50, . . . . .	. . . . . 3	Forestry 75, . . . . .	. . . . . 5
Botany,	51 II.	2		Rural Engineering 25, . . . . .	. . . . . 2	Landscape Gardening 50, . . . . .	. . . . . 5	Horticulture 50, . . . . .	. . . . . 5
Entomology,	75 III.	4				Botany 50, . . . . .	. . . . . 2		
Forestry,	50 I.	3	II.	Drawing 26, . . . . .	. . . . . 3	Forestry 51, . . . . .	. . . . . 3		
Forestry,	51 II.	3		Mathematics 26, . . . . .	. . . . . 2	Botany 51, . . . . .	. . . . . 2		
Forestry,	53 III.	3		Entomology 26, . . . . .	. . . . . 3	Landscape Gardening 51, . . . . .	. . . . . 4		
Forestry,	54 IV.	5		Botany 26, . . . . .	. . . . . 3				
Forestry,	75 I.	5	III.	Drawing 27, . . . . .	. . . . . 3	Forestry 53, . . . . .	. . . . . 3	Forestry 78, . . . . .	. . . . . 3
Forestry,	78 III.	3		Mathematics 27, . . . . .	. . . . . 2	Horticulture 51, . . . . .	. . . . . 5		
Horticulture,	50 I.	5		Entomology 27, . . . . .	. . . . . 3	Entomology 75, . . . . .	. . . . . 4		
				Horticulture 27, . . . . .	. . . . . 3				
Horticulture,	51 III.	5	IV.			Forestry 54, . . . . .	. . . . . 5		
Landscape Gardening,	50 I.	5							
Landscape Gardening,	51 II.	4							
		49							

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Drawing 25, 26 and 27, Rural Engineering 25, Mathematics 26 and 27, Entomology 26 and 27, Botany 26, Horticulture 27.

ADDITIONAL INFORMATION. — Substitutions according to individual needs may be made in conference with the adviser.

LANDSCAPE GARDENING. (Major.)
Professor FRANK A. WAUGH, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Floriculture,	78 III.	3	I.	Drawing 25, . . . . .	. . . . . 3	Landscape Gardening 50,	5	Landscape Gardening 75,	3
Horticulture,	50 I.	5				Horticulture 50,	5	Landscape Gardening 80,	4
Horticulture,	51 III.	5							
Landscape Gardening,	50 I.	5							
Landscape Gardening,	51 II.	4	II.	Drawing 26, . . . . .	. . . . . 3	Landscape Gardening 51,	4	Landscape Gardening 76,	4
Landscape Gardening,	52 III.	5		Mathematics 26, . . . . .	. . . . . 2			Landscape Gardening 81,	4
				Entomology 26, . . . . .	. . . . . 3				
Landscape Gardening,	75 I.	3	III.	Drawing 27, . . . . .	. . . . . 3	Landscape Gardening 52,	5	Landscape Gardening 78 or 79,	3
Landscape Gardening,	76 II.	4		Mathematics 27, . . . . .	. . . . . 3	Horticulture 51,	5	Landscape Gardening 77,	4
Landscape Gardening,	77 III.	4		Horticulture 27, . . . . .	. . . . . 3	Landscape Gardening 78 or 79,	3	Landscape Gardening 82,	4
Landscape Gardening,	78 III.	3	IV.					Floriculture 78,	3
or									
Landscape Gardening,	79 III.	3							
Landscape Gardening,	80 I.	4							
Landscape Gardening,	81 II.	4							
Landscape Gardening,	82 III.	4							
		56							

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Drawing 25, 26 and 27, Mathematics 26 and 27, Horticulture 27. ADDITIONAL INFORMATION. — Modifications may be permitted when they appear advisable.

POMOLOGY. (Major.)
Professor FRED C. SEARS, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomora.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy, Horticultural Manufactures, Vegetable Gardening,	77 II.	5	I.			Pomology 50,	3	Pomology 75,	3
	75 I.	5				Vegetable Gardening 51,	3	Pomology 77,	5
	51 I.	3				Botany 50,	1-4	Pomology 80, Horticultural Manuf.	1 5
Botany, Pomology, Horticultural Manufactures,	50 I.	1-4	II.			Pomology 51,	3	Pomology 76,	3
	50 I.	3				Vegetable Gardening 52,	3	Pomology 81, Horticultural Manuf.	1 3
	76 II.	3						Agronomy 77,	5
Pomology, Pomology, Pomology, Agricultural Economics, Rural Engineering,	51 II.	3	III.			Pomology 52,	3	Pomology 78,	3
	52 III.	3				Agricultural Economics 53,	5	Pomology 82, Rural Engineering 78,	1 5
	75 I.	3							
	53 III. 78 III.	5 5							
Pomology, Pomology, Pomology, Pomology, Pomology,	76 II.		IV.						
	77 I.								
	78 III.								
	80 I. 81 II. 82 III.								

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Horticulture 27.
ADVISED. — Rural Engineering 26, Entomology 26 and 27.
ADDITIONAL INFORMATION. — The rest of the sophomore electives allowed are left to the student to choose.

VEGETABLE GARDENING. (Major.)

Associate Professor A. L. DACY, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agromony,	75 I.	5	I.			Vegetable Gardening 51, . . . 3		Vegetable Gardening 75, . . . 5	
Agromony,	77 II.	5				Botany 50, 2		Agromony 75, 5	
Botany,	50 I.	2						Vegetable Gardening 78, . . . 1	
Botany,	51 II.	2							
Vegetable Gardening,	51 I.	3	II.	Botany 26, 3		Vegetable Gardening 52, . . . 3		Vegetable Gardening 76, . . . 5	
Vegetable Gardening,	52 II.	3				Botany 51, 2		Vegetable Gardening 79, . . . 1	
Vegetable Gardening,	53 III.	3						Agromony 77, 5	
Vegetable Gardening,	54 IV.	5	III.	Horticulture 27, 3		Vegetable Gardening 53, . . . 3		Vegetable Gardening 77, . . . 5	
Vegetable Gardening,	75 I.	5						Vegetable Gardening 80, . . . 1	
Vegetable Gardening,	76 II.	5	IV.						
Vegetable Gardening,	77 III.	5				Vegetable Gardening 54, . . . 5			
Vegetable Gardening,	78	1							
Vegetable Gardening,	79	1							
Vegetable Gardening,	80	1							
		46							

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Botany 26, Horticulture 27.

ADVISED. — Rural Engineering 26, Entomology 26 and 27.

ADDITIONAL INFORMATION. — The rest of the sophomore electives allowed are left to the student to choose.

ECONOMIC BOTANY. (Major.)
Professor A. VINCENT OSMUN, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

COURSE.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany,	52 I.	3	I.	Chemistry 25, . . .	3	Botany 52, . . .	3	Botany 75, . . .	5
Botany,	53 II.	3		German 25 or 28, . .	3	Botany 55, . . .	3	Botany 78, . . .	5
Botany,	54 III.	3				Chemistry 51, . .	3	Botany 86, . . .	1
Botany,	55 I.	3							
Botany,	56 II.	3							
Botany,	75 I.	5	II.	Chemistry 26, . . .	3	Botany 53, . . .	3	Botany 76, . . .	5
Botany,	76 II.	5		German 26 or 29, . .	3	Botany 56, . . .	3	Botany 79, . . .	5
Botany,	77 III.	5		Botany 26, . . .	3			Botany 82, . . .	3
Botany,	78 I.	5						Botany 87, . . .	1
Botany,	79 II.	5							
Botany,	80 III.	5							
Botany,	82 II.	3	III.	German 27 or 30, . .	3	Botany 54, . . .	3	Botany 77, . . .	5
Botany,	83 III.	3		Botany 27, ¹ . . .	3			Botany 80, . . .	5
Botany,	86 I.	1						Botany 83, . . .	3
Botany,	87 II.	1						Botany 88, . . .	1
Botany,	88 III.	1							
Chemistry,	51 I.	8							
		62	IV.						

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — German 25 or 28, 26 or 29, 27 or 30, Botany 26.
ADVISED. — Chemistry 25 and 26.
ADDITIONAL INFORMATION. — The balance of the sophomore electives allowed are left to the student to choose.
Selection of 45 credits of the above (Pathology 75, 76 and 77, Physiology 78, 79 and 80).

¹ May be taken in junior or senior year.

AGRICULTURAL CHEMISTRY. (Major.)

PROFESSOR CHARLES A. PETERS, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.		Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.		
Chemistry, .	.	51 I.	8	I.	Chemistry 25, . . .	3	Chemistry 51, . . .	8	Chemistry 76, . . .	5		
Chemistry, .	.	52 II.	8							Chemistry 80, . . .	5	
Chemistry, .	.	62 III.	5									
Chemistry, .	.	65 III.	5	II.	Chemistry 26, . . .	3	Chemistry 52, . . .	8	Chemistry 77, . . .	3		
Chemistry, .	.	76 I.	5							Chemistry 86, 92, 94, . . .	3	
Chemistry, .	.	77 II.	5									
Chemistry, .	.	80 I.	5									
Chemistry, .	.	87 III.	3									
Chemistry, .	.	86 II.	3 ¹									
Chemistry, .	.	92 II.										
Chemistry, .	.	94 II.										
Chemistry, .	.	91 III.	5	III.	Chemistry 27, . . .	5	Chemistry 62, . . .	5	Chemistry 91, 93, 95, . . .	5		
Chemistry, .	.	93 II.							Chemistry 65, . . .	5	Chemistry 87, . . .	3
Chemistry, .	.	95 III.										
			50 ²	IV.								

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Chemistry 25, 26 and 27.

ADVISED. — German 25 or 28, 26 or 29, 27 or 30, Physics 27.

ADDITIONAL INFORMATION. — The balance of the sophomore electives allowed are left for the student to choose.

¹ Courses 90, 92, 94 may be changed from 3 credits to an option of 3 or 5 credits. Students will select one course from groups 90, 92, 94, and 91, 93, 95 respectively.² Only 45 credits required.

ECONOMIC ENTOMOLOGY. (Major.)

Professor HENRY T. FERNALD, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany,	50 I.	3	I.	French 25 or 28, } or German 25 or 28, } Chemistry 25, . . .	. . . 3 . . . 3 . . . 3	Entomology 54, . . Entomology 53, . . Botany 50 or 52, . . Zoology 50 or 53, . . or Chemistry 51, . . .	. . . 3 . . . 5 . . . 3 . . . 3 . . . 8	Entomology 75, . . Entomology 55, . . Vegetable gardening 50, . . Horticulture 50, . . .	. . . 5 . . . 3 . . . 3 . . . 3
Entomology,	53 I. 54 II. 55 III. 75 III. 76 I.	5 3 3 4 5	II.	French 26 or 29, } or German 26 or 29, } Entomology 26, . . Botany 26, . . .	. . . 3 . . . 3 . . . 3 . . . 3	Entomology 52, . . Entomology 50, . . Microbiology 50, . .	. . . 3 . . . 3 . . . 5	Entomology 77, . . Entomology 90, . . .	. . . 3 . . . 3
Entomology,	77 II. 78 III. 90 II.	3 4 3	III.	French 27 or 30, } or German 27 or 30, } Entomology 27, . .	. . . 3 . . . 2	Entomology 55, . . Entomology 75, . . Entomology 55, . . Horticulture 27, . . Pomology 79, . . .	. . . 3 . . . 4 . . . 5 . . . 3 . . . 3	Entomology 78, . . Horticulture 51, . . Pomology 78, . . .	. . . 4 . . . 5 . . . 3
Zoology,	50 I.	3	IV.						
Zoology,	53 I.	3							
Chemistry,	51 I.	8							
		42 or 47							

SOPHOMORE ELECTIVE PREREQUISITES (REQUIRED). — Entomology 26 and 27, Botany 26.

Advised. — French or German 25 to 27 or 28 to 30, Chemistry 25; the other subjects (except Entomology) in the last three columns above are merely suggested as desirable to choose from.

MICROBIOLOGY. (Major.)
Professor CHARLES E. MARSHALL, Adviser.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Chemistry, .	51 I.	8	I.	Chemistry 25, 3 3	Microbiology 50, 5	Microbiology 81, 5
Chemistry, .	52 II.	8		German or French 25 or 28, 3		Chemistry 51, 8		Microbiology 82,	
Microbiology, .	50 I.	5						Microbiology 83,	
Microbiology, .	50 II.		II.	German or French 26 or 29, 3 3	Microbiology 51, 5	Microbiology 75, 5
Microbiology, .	50 III.					Chemistry 52, 8		Microbiology 80,	
Microbiology, .	51 II.	5				Microbiology 50, 5		Dairying 75, 5	
Microbiology, .	51 III.		III.	Chemistry 27, 5 5	Microbiology 50, 5	Microbiology 76, 5
Microbiology, .	52 III.	5		German or French 27 or 30, 3		Microbiology 51,			
Microbiology, .	81 I.			Physics 27, 5		Microbiology 52, 5			
Microbiology, .	82 I.	5	IV.						
Microbiology, .	83 I.								
Microbiology, .	80 II.								
Microbiology, .	75 II.	5							
Dairying,	75 II.								
Microbiology,	76 III.	5							
		46							

SOPHOMORE ELECTIVE (RECOMMENDATIONS). — German or French 25 or 28, 26 or 29, 27 or 30, Chemistry 25 and 27, and Physics 27.

ADDITIONAL INFORMATION. — The rest of the sophomore electives allowed are left for the student to choose. Microbiology 51, fall term, will be taken by students who have had Microbiology 50 at any previous time and by those who are permitted to omit Microbiology 50.

RURAL JOURNALISM. (Major.)

— — — — — *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Junior.	Credit.	Senior.	Credit.
Rural Journalism,	50 I.	3	I.		Journalism 50,	3	Journalism 77,	3
Rural Journalism,	51 II.	3			Journalism 53,	3	Journalism 80,	4 (5)
Rural Journalism,	52 III.	3			Economics and Sociology 51, 5	5		
Two out of three: —								
Rural Journalism,	53 I.	3	II.	Economics and Sociology 26, 5	Journalism 51,	3	Journalism 78,	3
Rural Journalism,	54 II.	3			Journalism 54,	3	Journalism 81,	4 (5)
Rural Journalism,	55 III.	3						
Two out of three: —								
Rural Journalism,	77 I.	3	III.		Journalism 55,	3	Journalism 79,	3
Rural Journalism,	78 II.	3			Journalism 52,	3	Journalism 82,	4 (5)
Rural Journalism,	79 III.	3			Agricultural Economics 51, 5	5		
One from: —								
Entomology,	90 II.							
or								
Animal Husbandry,	53 III.	3						
Landscape,	75 I.							
Chemistry,	87 III.							
All: —								
Rural Journalism,	80 I.	4 (5)						
Rural Journalism,	81 II.	4 (5)						
Rural Journalism,	82 III.	4 (5)						
Rural Sociology,	78 II.	5	IV.					
Agricultural Economics,	51 III.	5						
Economics and Sociology,	51 I.	5						
		45-47						

SOPHOMORE PREREQUISITES. — All sophomore English.

SOPHOMORE RECOMMENDATIONS. — French or German; Drawing 25. For agricultural journalism especially: Animal Husbandry 25, 26, Chemistry 30, Entomology 26, 27.

AGRICULTURAL ECONOMICS. (Major.)

Professor ALEXANDER E. CANCE, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agricultural Economics,	50 I.	5	I.			Agricultural Economics 50, 5		Agricultural Economics 77, 5	
Agricultural Economics,	52 II.	5				Economic Sociology 51, . 5		Agricultural Economics 79, 5	
Agricultural Economics,	53 III.	5						Farm Management 76, . 3	
Agricultural Economics,	78 III.	3							
Agricultural Economics,	76 II.	5	II.			Agricultural Economics 52, 5		Agricultural Economics 76, 5	
Agricultural Economics,	75 II.	5				Rural Sociology 51, . . 3		Agricultural Economics 75, 5	
Agricultural Economics,	79 I.	5				Economic Sociology 50, . 5			
or									
Agricultural Economics,	77 I.		III.						
Economic Sociology,	51 I.	5							
Economic Sociology,	50 II.	5				Rural Sociology 52, . . 3		Agricultural Economics 78, 3	
Farm Management,	76 I.	3				Agricultural Economics 53, 5			
Rural Sociology,	51 II.	3	IV.						
or									
Rural Sociology,	52 III.								
		49							

ADDITIONAL INFORMATION. — The sophomore electives are left to the student to choose. Animal husbandry is suggested for terms I. and II., and Economic Sociology for term III.

AGRICULTURAL EDUCATION. (Major.)
Professor WILLIAM R. HART, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

COURSE.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agricultural Education,	50 I.	5	I.	Animal Husbandry 25,	3	Agricultural Education 50, Agricultural Education 51, 5	5	Agricultural Education 76, 3 Agricultural Education 80, 1-5	
Agricultural Education,	51 I.	5		Rural Engineering 25,	2				
or	51 II.	5							
Agricultural Education,	51 III.	5	II.	Entomology 26,	3	Agricultural Education 51, 5	5	Agricultural Education 75, 3 Agricultural Education 76, 3 Agricultural Education 77, 5 Agricultural Education 80, 1-5	
Agricultural Education,	52 III.	5		Rural Engineering 26,	2				
Agricultural Education,	75 II.	3		Animal Husbandry 26,	3				
or	76 I.	3	III.			Agricultural Education 51, Agricultural Education 52, 5	5	Agricultural Education 76, 3 Agricultural Education 78, 5 Agricultural Education 80, 1-5	
Agricultural Education,	76 II.	3							
or	76 III.	3		Entomology 27,	3				
Agricultural Education,	77 II.	5	III.	Horticulture 27,	3				
Agricultural Education,	78 III.	5							
Agricultural Education,	80 I.	1-5							
or	80 II.	1-5							
or	80 III.	1-5							
or	80 IV.	1-5							

ADDITIONAL INFORMATION. — Courses 50, 51, 76 and 80 or their equivalents are required of all candidates for teaching. Credits vary from 14 to 18. Courses 51, 77 or 78 are required of all candidates for county agent work. Students who are intending to teach are recommended to take as many of the sophomore electives listed above as possible in the sophomore year. Programs for juniors and seniors are planned on the basis of individual needs, with a view to the most desirable preparation for the attainment of the student's aim. Some of the aims for which programs are planned are as follows: teaching vocational agriculture; teaching non-agricultural subjects in vocational agricultural schools and departments; teaching agriculture in high schools not of the vocational type; county agent work and Junior Extension work; directing physical education and county Y. M. C. A. work; rural school supervision and rural leadership; positions as supervisors and directors of agricultural teaching; and college positions in Agricultural Education.

RURAL SOCIOLOGY. (Major.)

Professor JOHN PHELAN, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

COURSE.	Credit.		Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
	Number.								
Agricultural Economics,	50 I.	5	I.			Agricultural Economics 50,	5	Economics and Sociology 75,	5
Agricultural Economics,	52 II.	5				Rural Sociology 50,	3		
Economics and Sociology,	51 I.	5				Economic Sociology 51,	5		
Economics and Sociology,	75 I.	5							
Economic Sociology,	77 III.	5	II.			Rural Sociology 51,	3	Rural Sociology 77,	3
Rural Journalism,	55 III.	3				Agricultural Economics 52,	5	Rural Sociology 78,	5
						Agricultural Education 52,	5		
Rural Sociology,	50 I.	3	III.						
Rural Sociology,	52 III.	3				Rural Journalism 55,	3	Economic Sociology 77,	5
Rural Sociology,	51 II.	3				Rural Sociology 52,	3		
Rural Sociology,	77 II.	3							
Agricultural Education,	52 II.	5							
or									
Agricultural Economics,	75 II.	5							
		45							

ADDITIONAL INFORMATION. — The sophomore electives allowed are left to the student to choose.

DESCRIPTION OF COURSES

DESCRIPTION OF COURSES.

DIVISION OF AGRICULTURE.

Professor FOORD.

[Heavy-faced Roman numerals indicate the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

AGRICULTURE AND HORTICULTURE. Freshmen. This course continuing through the year constitutes the required elementary work dealing with the foundations of the subjects of live stock and the crops of the field, orchard and the garden. Several departments collaborate in giving the work; three credits each term are assigned to this course. For a description of the work see —

Agronomy 1, **I**.
Animal Husbandry 1, **II**.
Horticulture 1, **I**.
Poultry Husbandry 1, **II**.

Agronomy.

Professor BEAUMONT, Assistant Professor MICHELS, Mr. THELIN, Mr. THAYER, Mr. LANPHEAR.

The courses in agronomy are designed to present the fundamental knowledge concerning the soil and the principal products of the field. The basic course in soils is required of all students. The electives purpose to meet the needs of those specializing in soils and field crops and other specialized fields including both pure and applied science.

The laboratories for soils and fertilizers include one for elementary work, supplied with locker equipment for 200 students, and one for advanced work, accommodating 80 students. These laboratories are equipped with steam and electric ovens, balances, centrifuge, microscopes and other apparatus necessary for a study of soils and fertilizers. Storerooms, stock rooms, and balance rooms are conveniently near the laboratories. There is also a workroom attached, equipped with power machinery for grinding soils, fodders and the like.

The crops' laboratories include one for seed study, with lockers for 50 students, and a laboratory for the study of cereals, forage crops, roots, etc., with lockers for 64 students. The equipment of these laboratories includes steam ovens, constant temperature electric ovens, ovens for seed germination, Brown-Duval moisture apparatus, balances, microscopes, and collections of seeds, grasses, tubers, weeds, etc. A balance room, root cellar and two store-rooms, one of which is mouse-proof, are also used for crop work.

A modern steam-heated greenhouse 25 by 35 feet, used for work in soils and crops, is a valuable part of the equipment. Near the greenhouse is a crop garden on which different varieties of corn, grasses, clovers, etc., are grown for

demonstration purposes, and as a source of material for class work. In addition, the general college farm of 250 acres is used for field study in soils and crops, and as a source of material.

Required Courses.

1. **I. AGRONOMY.** — Freshmen. Given as part of the freshman agriculture and horticulture. This course aims, by actual contact with the plants and the plant products, to make the students familiar with the common field, garden and orchard crops of Massachusetts.

Assistant Professor MICHELS and the DEPARTMENT.

27. **III. SOILS AND FERTILIZERS.** — Sophomores. A study of soils and their properties, soil management, methods of soil improvement and maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments.

4 class hours.

1 2-hour laboratory period, credit, 5.

Professor BEAUMONT and the DEPARTMENT.

Prerequisites, Freshman-required Chemistry.

Elective Courses.

50. **I. FIELD AND FORAGE CROPS.** — For juniors; seniors may elect. History, classification and production of corn and of those grasses, legumes, root and tuber crops suited to New England conditions. Crops of less importance in New England are briefly considered. The work includes lecture, laboratory and field study.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor MICHELS and the DEPARTMENT.

Prerequisites, Agronomy 27, Botany 3.

51. **III. ADVANCED FIELD CROPS.** — For juniors; seniors may elect. Study of the cereals and other field crops not taken up or only briefly considered in Course 50. General problems of crop production are also considered, and the work is not entirely confined to New England conditions. The laboratory work includes a study of the cereals, the quality of seeds, grains and crop products, crop problems and field work with such crops as are available.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor MICHELS and the DEPARTMENT.

Prerequisite, Agronomy 50.

75. **I. ADVANCED SOILS.** — For seniors; juniors may elect. A field, lecture and laboratory course on soils and their adaptability to different uses. The field work consists of a detailed study of soil textures, natural and spontaneous vegetation and other factors which indicate the fertility and adaptation of the soil; accompanied by a laboratory study of the physical properties of the soils sampled.

2 class hours.

1 4-hour and 1 2-hour laboratory period, credit, 5.

Professor BEAUMONT and the DEPARTMENT.

Prerequisite, Agronomy 27. Advised, Geology 27.

77. **II. MANURES AND FERTILIZERS.** — Seniors. An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Considerable attention is devoted to consideration of the experimental work which has been done, and which is now in progress. The laboratory work consists of a study of fertilizers, fertilizer mixtures, limes and culture work.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor BEAUMONT and the DEPARTMENT.

Prerequisite, Agronomy 27. Advised, Chemistry 27.

78. **II. BREEDING OF FIELD CROPS.** — Seniors. Deals with the improvement, by selection and breeding, of the crops studied in Courses 50 and 51.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor MICHELS.

Prerequisite, Agronomy 51.

Animal Husbandry.

Professor SALISBURY, Assistant Professor RICE, Assistant Professor GLATFELTER, Mr. THAYER.

It is the purpose of this department to present comprehensive information on the subject of animal husbandry. The first courses are studies of the breeds, types and market classes of live stock. These are followed by courses in judging, breeding and management.

The department is equipped with an excellent laboratory, Grinnell Arena, which has a seating capacity of 180. The equipment for classroom instruction includes upwards of 125 head of dairy cattle which are superior representatives of Jersey, Guernsey, Ayrshire and Holstein breeds; considerable numbers of Berkshire and Chester White pigs; pure-bred Percherons; and several work teams of various types. The department has a collection of plaster of Paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine; and a set of over 250 lantern slides portraying the leading prize-winning producing and breeding animals of the principal breeds of horses, cattle, sheep and swine. There is also a collection of the different foodstuffs available for the use of New England farmers. All this equipment is being added to from time to time as funds are available.

Required Course.

1. **II. ANIMAL HUSBANDRY.** — Freshmen. Given as part of the freshman agriculture and horticulture. Acquaints the student with the foundations of the live-stock industry. In the lectures the types and market classes of farm animals, and their uses, are considered; in the laboratory period elementary judging practice familiarizes the student with animals of the various types.

1 class hour.

1 2-hour laboratory period, credit, 2.

Mr. THAYER.

Elective Courses.

25. **I. TYPES AND BREEDS OF LIVE STOCK.** — Sophomores. Covers the origin, history, development and characteristics of the different breeds of horses, cattle, sheep and swine. Textbook, Plumb's "Breeds and Types of Farm Animals."

2 lectures.

1 2-hour laboratory period, credit, 3.

Professor SALISBURY and Mr. THAYER.

26. **II. TYPES AND BREEDS OF LIVE STOCK.** — Sophomores. Continuation of Course 25.

2 lectures.

1 2-hour laboratory period, credit, 3.

Professor SALISBURY and Mr. THAYER.

50. **I. FEEDS AND FEEDING.** — For juniors. A study of the principles of animal nutrition; of the composition and qualities of feeding materials. Textbook, Henry's "Feeds and Feeding."

3 class hours.

Credit, 3.

Assistant Professor RICE.

Prerequisite, Chemistry 30 or 6.

51. **II. FEEDS AND FEEDING.** — For juniors. A study of feeding practice as related to all farm animals. Considerable work will be given in the formulating of rations.

3 class hours.

Credit, 3.

Assistant Professor RICE.

Prerequisite, Animal Husbandry 50.

52. **III. ADVANCED STOCK JUDGING.** — For juniors; seniors may elect. Designed to equip students in the judging of classes of different types of live stock; to strengthen them in the selection of superior sires; and equip them for stock judging at fairs. Visits are made to the best herds for the various breeds of stock in the State. Judging teams to represent the college will be selected from this class.

1 2-hour and 1 4-hour laboratory period, credit, 3.

Professor SALISBURY.

Prerequisite, Animal Husbandry 25 and 26.

53. **III. PRINCIPLES OF BREEDING.** — For juniors; seniors may elect. Designed to familiarize students with the problems that are involved in animal improvement; to acquaint them with the facts which are already established; to scrutinize prevailing theories; and to indicate the lines and methods of further work. Some of the subjects studied are: variations, their causes and heritability; DeVrie's theory of mutations; the inheritance of acquired characters; the pure line; Mendelian law; the making of new types; the determination of sex; applications to human heredity. A few periods at the end of the course are devoted especially to the application of principles in live-stock improvement. Supplementary reading.

3 class hours.

Credit, 3.

Assistant Professor RICE.

Prerequisite, Zoölogy 25.

75. I. LIVE-STOCK MANAGEMENT. — For seniors. Consists of laboratory work by the individual students in the handling of live stock; with horses, such work as halter breaking, harnessing, casting and fitting for show will be done; similarly, the practical handling of cattle, sheep and swine will be fully treated. Special study is given to halter making, splicing, hitches, knots and all rope work.

2 lectures:

1 2-hour laboratory period, credit, 3.

Professor SALISBURY.

Prerequisites, Animal Husbandry 50 and 51.

78. II. HERD AND STUD-BOOK STUDY. — For seniors; juniors may elect. An advanced study of the breeds of live stock, familiarizing the students with the detailed history of the breed, the most productive sires and dams of the various breeds, and the successful lines and methods of breeding.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor SALISBURY.

Prerequisite, Animal Husbandry 53.

79. III. DAIRY, CATTLE and MILK PRODUCTION. — A study of the leading breeds of dairy cattle, the most successful breeders and famous breeding animals, advanced registry testing and feeding for production, sales methods and advertising.

2 lectures.

1 2-hour laboratory period, credit, 3.

Professor SALISBURY.

Prerequisites, Animal Husbandry 51, 52, 53 and 78.

81. II. DAIRY and ANIMAL HUSBANDRY. — Seminar for seniors majoring in dairying and animal husbandry.

1 class hour.

Credit, 1.

DEPARTMENTS OF DAIRYING and ANIMAL HUSBANDRY.

82. III. A continuation of Course 81.

1 class hour.

Credit, 1.

DEPARTMENTS OF DAIRYING and ANIMAL HUSBANDRY.

Dairying.

Professor LOCKWOOD, Professor JUDKINS, Assistant Professor YAXIS, Mr. PENDLETON, Mr. SMITH.

The dairy manufactures building is new, well lighted and of sanitary construction. It is designed and equipped especially for teaching dairy manufactures. The equipment includes all kinds of machinery that are considered essential to the proper handling of milk and the making of cream, butter, ice cream and soft cheeses.

Course 77 is for students who desire a general idea of dairy work and manufacturing processes. Part of the courses are arranged to give instruction in general dairy work as associated with Massachusetts agriculture; part are arranged to give to a smaller group of students more complete work in dairy manufactures.

Elective Courses.

50. **I. MILK AND MILK COMPOSITION.** — For juniors; seniors may elect. The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; the study of analysis of milk products by use of the Babcock test for fat, tests for acidity and adulteration, and ordinary preservatives; moisture tests for butter; methods for testing herds and developing them to higher efficiency; problems.
3 class hours.

2 2-hour laboratory periods, credit, 5.
Professors JUDKINS and YAXIS.

51. **III. BUTTER MAKING.** — For juniors; seniors may elect. A study of separators and cream separation; handling milk and cream for butter making; preparation of starters, and ripening cream; churning; markets and their requirements; marketing, scoring and judging butter; management; dairy machinery and care thereof; problems.
2 class hours.

2 3-hour laboratory periods, credit, 5.
Assistant Professor YAXIS.

Prerequisite, Dairying 50.

52. **III. JUDGING DAIRY PRODUCTS.** — For juniors.

1 2-hour laboratory period, credit, 1.
Professor JUDKINS.

75. **II. MARKET MILK.** — For seniors; juniors may elect. A study of market-milk conditions; extent and development of the business; supply and delivery; food value of milk and its uses as food; milk and its relation to the public health; proper methods for handling milk and cream for direct consumption; certified milk, requirements and production; pasteurizing; sterilizing; standardizing and modifying; milk laws and inspection.
3 class hours.

2 2-hour laboratory periods, credit, 5.
Professor JUDKINS.

Prerequisites, Dairying 50, Microbiology 50.

76. **III. MILK PRODUCTS.** — For seniors; juniors may elect. The manufacture of milk products other than butter, including cheddar cheese, soft and fancy cheese, ice cream, condensed milk, casein, milk powder, etc. Laboratories, largely the making of soft and fancy cheese and ice cream.
2 class hours.

2 3-hour laboratory periods, credit, 5.
Mr. PENDLETON.

Prerequisite, Dairying 75.

77. **I. DAIRYING.** — For seniors; juniors may elect. A general course primarily for those who wish to take only one course in dairying. The work covers briefly the composition and secretion of milk, the Babcock fat test, the relation of bacteria to dairy work and principles of creaming; separators; elementary butter making; proper methods of handling milk and cream; and the relation of market milk to the public health.
3 lecture hours.

2 2-hour laboratory periods, credit, 5.
Assistant Professor YAXIS.

Farm Management.

Professor FOORD, Assistant Professor ABELL.

The purpose of the courses in this department is to present various considerations of farming as a business. This involves a knowledge of the cost of production and the profit from the different enterprises such as dairy, poultry or orchard; a study of the enterprises, and the relative amounts of each that will give the best use of labor and equipment on the farm under consideration.

The college farm of 250 acres is under the general supervision of the Department of Farm Management, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied. The offices of the department are in Stockbridge Hall.

75. I. FARM ACCOUNTS AND COST ACCOUNTING. — For seniors; juniors may elect. A study of farm inventories, single-enterprise accounts, complete farm accounts and farm records. Special emphasis is given to the interpretation of results and their application in the organization and management of the farm.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professors FOORD and ABELL.

76. I. FARM MANAGEMENT. — For seniors; juniors may elect. A study of farming as a business; regions and types of farming; the general principles of farm management and the influence of size, production, live stock and crop farming on the farmer's labor income; arrangement of fields and buildings; use of land, capital and labor; choosing and buying a farm.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor ABELL.

Prerequisites, Agronomy 50, Animal Husbandry 25 and 26, and some farm experience.

77. III. FARM MANAGEMENT. — For seniors; juniors may elect. A further and more specific study of the principles and practices as outlined in Course 76, with reference to their application to different regions of the United States and especially to New England. Trips to successful farms are a required part of the course.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professors FOORD and ABELL.

Prerequisites, Farm Management 75 and 76.

78. II. SEMINAR. — For seniors majoring in general agriculture; others by arrangement.

1 class hour.

Credit, 1.

The DEPARTMENT.

79. **III. SEMINAR.** — For seniors majoring in general agriculture; others by arrangement.

1 class hour.

Credit, 1.

The DEPARTMENT.

Poultry Husbandry.

Professor GRAHAM, Professor SANCTUARY, Dr. GOODALE, Assistant Professor BANTA, Mr. RYAN.

The introductory courses (1, 50, 51, 52, 53, 54) give a knowledge of the general routine of elementary poultry keeping. The advanced studies prepare men for the successful operation of poultry plants, either as owners or managers. Graduate work, preparation for further teaching, extension or investigation.

The poultry plant consists of 8 acres of land sloping gently to the west. The buildings consist of three incubator cellars equipped with a number of lamp incubators and two mammoth machines with a total capacity of 9,000 eggs; a pipe brooder house (open pipe system) and 40 colony brooder houses which give a brooding capacity for 7,000 chicks, the equipment for these houses including a large variety of coal-stove brooders and kerosene hovers; a long laying house 14 by 180 feet, which accommodates 500 layers, furnishing facilities for student work in pen management, utility and fancy judging, etc.; and a laboratory 14 by 80, for killing, picking, drawing, trussing, packing, crate fattening and cramming. The fattening equipment consists of a modern sanitary all-steel battery with 16 compartments and 10 wooden crates, accommodating, altogether, 350 birds. There are also a storage building, 28 by 64 feet, for root cellar, poultry carpentry, poultry mechanics, feed room and storage; an experimental breeding house, 18 by 60; a combination laying, testing and breeding house, 18 by 72, for experimental purposes; a model laying house, 18 by 30, for 100 hens, and a house 20 by 40, for 200 hens. The six old experiment-station houses, each 12 by 18 feet, are used as special mating and overflow pens. The total capacity for laying hens is 1,600. A manure shed 14 by 18 feet; an oil and tool house 10 by 12; an incinerator 10 by 10; and two backyard model poultry houses 8 by 10 and 8 by 8 give a total of 76 buildings, not including a pheasant run, 16 roosting sheds 10 by 10, and numerous small coops for natural incubation and brooding.

Required Course.

1. **I. POULTRY HUSBANDRY.** — Given as part of the freshman agriculture and horticulture. Familiarizes the students with the fundamental principles of poultry husbandry, — breeds and varieties of poultry, types of houses, feeds and feeding, management, marketing and the principles of incubation and brooding.

1 2-hour period, credit, 1.

Mr. RYAN.

Elective Courses.

50. **I. ELEMENTS OF POULTRY CULTURE.** — For juniors; seniors may elect. A comprehensive study of opportunities in poultry culture, poultry-house construction, poultry-house equipment, feeds and feeding, winter-egg production, types and breeds of poultry.

3 class hours.

Credit, 3.

Professors GRAHAM, SANCTUARY and BANTA.

51. I. POULTRY PRACTICE WORK. — For juniors; seniors may elect. A practical laboratory course providing a study of external parasites, insecticides, poultry carpentry, caponizing, killing and picking; dressing and packing poultry.

2 2-hour laboratory periods, credit, 2.

Professor SANCTUARY.

Prerequisite, must be accompanied by Poultry 50.

52. II. ELEMENTS OF POULTRY CULTURE. — For juniors; seniors may elect. Treats the subjects of incubation, brooding, care of growing stock, breeding for egg-production, diseases of poultry.

3 class hours.

Credit, 3.

Professors SANCTUARY and BANTA.

Prerequisite, Poultry 50.

53. III. INCUBATION AND BROODING. — For juniors; seniors may elect. Students are required to set up and operate incubators and brooders, make a systematic study of the development of the chick in the egg and the care of sitting hens. Laboratory time by arrangement.

1 class hour.

4 2-hour laboratory periods, credit, 5.

Professor SANCTUARY.

Prerequisite, Poultry 52.

54. III. PEN MANAGEMENT. — For juniors; seniors may elect. A practical laboratory course. Students are required to care for a pen of fowls, and keep accurate records of eggs produced, food consumed, weather conditions, health of fowls and profit and loss.

1 2-hour laboratory period, credit, 1.

Mr. RYAN.

Prerequisite, Poultry 50.

55. I, II and III. INVESTIGATIONAL WORK. — Seniors. Designed especially for students who are planning to do experiment station work. Students are assigned specific problems to work out experimentally, or they may be required to assist in carrying on such work.

1 to 5 2-hour laboratory periods, credits, 1 to 5.

Dr. GOODALE.

75. II. POULTRY MANAGEMENT. — Seniors. A detailed study of large poultry farms and their equipment, such as bone cutters, feed cutters, cramming machines, etc.; the laying out and planning of poultry buildings of all kinds; mating of fowls. Attention to poultry diseases and investigation work carried on by experiment station is prominent. Good poultry plants are visited by the class for practical demonstrations.

5 class hours.

Credit, 5.

Professor GRAHAM.

Prerequisites, Poultry 53, 54, 76 and 77.

76. **I. ADVANCED POULTRY JUDGING.** — Seniors. A study of the origin and history of breeds and varieties, poultry organizations and poultry shows. The laboratory work covers score card and comparative judging of exhibition and utility poultry; conditioning show birds, and applying the latest methods of selecting high and low producing hens. The best Connecticut Valley poultry shows are visited by the class. The American Standard of Perfection is used as a text.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Assistant Professor BANTA.

Prerequisite, Poultry 53.

77. **I. MARKET POULTRY AND POULTRY PRODUCTS.** — Seniors. The study of market classifications of poultry, eggs and feathers, the requirements of different markets, methods of marketing, advantages and disadvantages of cold storage of poultry and eggs. Students are required to fatten several lots of chickens by different methods and rations. Accurate data must be kept showing the gain in weight and quality, also the cost of feed, labor, etc., and the profit and loss. Preserving eggs, judging and scoring of market poultry, both alive and dressed, and market eggs is an important feature of this course.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Mr. RYAN.

Prerequisites, Poultry 50, 51 and 52.

78. **III. FARM POULTRY.** — Seniors; juniors may elect. For those students who desire a general knowledge of poultry husbandry, but who cannot devote more than one term to the subject. It is not intended for students specializing in poultry, and such students are admitted only by special permission. Emphasis is placed on the farm flock and its economic management. Utility classification, housing, culling, feeding, hatching, rearing, production, marketing and disease control receive special consideration.

3 class hours.

2 2-hour laboratory periods, credit, 5.

The DEPARTMENT.

Rural Engineering.

Professor GUNNESS, Assistant Professor STRAHAN, Mr. PUSHEE, Mr. NEWLON.

The courses in rural engineering are planned to give a working knowledge of those phases of engineering which apply directly to the farm. It is expected that the student will acquire a clear understanding of modern farm practice as it relates to permanent improvements of the farm and the farmstead, and in the selection and use of farm equipment.

This department has an office and the use of a lecture room in Stockbridge Hall. The work on farm structures is given in the large drawing room in the same building. This room is fitted with thirty drawing tables. Models and blue prints are available for the study of farm buildings. A set of post molds and a machine for making cement tile afford opportunity for practical work with cement.

The rural engineering shop is a one-story structure 68 by 126 feet. The carpenter shop in this building is fitted with benches fully equipped with tools for each student. The general repair shop is equipped with forges,

benches, a drill press and grinders. The laboratory for farm machinery and farm motors is equipped with a complete line of field machines, gasoline engines, tractors and pumps. A complete assortment of engine accessories, consisting of carburetors, magnetos, etc., is available for thorough instruction in gas engines. A small dynamo and switchboard are used in the study of farm-lighting systems. The work on the small field machines is given in the basement of Stockbridge Hall, and the work on steam engines and steam heating is given in Flint Laboratory.

Elective Courses.

25. **I and III. CARPENTRY.** — For sophomores; juniors and seniors may elect. Practice in the use of tools by exercises in bench work, repair of farm equipment and farm building construction.

2 2-hour laboratory periods, credit, 2.

Mr. PUSHEE.

26. **II. REPAIR OF FARM EQUIPMENT.** — For sophomores; juniors and seniors may elect. Exercises in forge work, pipe fitting, soldering, babbitting and fitting bearings, lining up shafting, lacing belts and splicing rope. Practice in the use of machinist's tools, such as file, cold chisel, drill press, taps and dies.

2 2-hour laboratory periods, credit, 2.

Mr. NEWLON.

52. **III. FARM ENGINEERING.** — A general course dealing with field implements, gas engines, water supply, lighting, sewage disposal, farm buildings, drainage and irrigation.

2 class hours.

3 2-hour laboratory periods, credit, 5.

The DEPARTMENT.

75. **I. FARM STRUCTURES.** — For seniors; juniors may elect. Study of the strength and durability of building materials; water supply; lighting and heating systems for the farm; lightning protection; drawing plans, writing specifications and estimating the cost of buildings; concrete construction as applied to foundations, silos, tanks, posts, floors and walks.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor STRAHAN.

78. **II and III. FARM MACHINERY.** — For seniors; juniors may elect. Study of the care and operation of tillage, seeding, harvesting, pumping and spraying machinery; steam and gas engines and gas tractors. Special attention is given to the use of power on the small farm.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Professor GUNNESS.

79. **III. DRAINAGE AND IRRIGATION ENGINEERING.** — For seniors; juniors may elect. Covers the engineering phase of drainage and irrigation. The various systems are studied, and practice is given in the design of drainage and irrigation systems. Field work gives practice in surveying for drains,

platting, locating drains, erecting batterboards and laying tile. Practice is given in assembling equipment for spray irrigation, and the flow of water through nozzles is studied by means of laboratory tests.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Assistant Professor STRAHAN.

80. **II. FARM BUILDING DESIGN.**—For seniors; juniors may elect. Students are expected to bring to this course a specific design problem which will be completed in all its details through the making of blue prints and estimating a detailed bill of materials.

2 drafting periods per week by arrangement.

Credit, 2.

Assistant Professor STRAHAN.

DIVISION OF HORTICULTURE.

Professor WAUGH.

[Heavy-faced Roman numerals indicate the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Floriculture.

Professor THAYER.

The courses in floriculture are intended to present a general knowledge of all phases of greenhouse design, construction, heating and management, the culture of florists' crops (under glass and in the field), floral decoration and arrangement. The department aims to train students so that they may take up commercial floriculture (either in the growing or retail business) and the management of conservatories on private estates, in parks and cemeteries.

The department is especially well equipped for the teaching work, probably being surpassed in no other agricultural college. French Hall, with its laboratories, classrooms and offices, furnishes excellent facilities for the purposes of instruction. The glass area of the department consists of approximately 20,000 square feet, divided as follows: French Hall range of 7,200 square feet, a durable, practical, commercial range composed of palm and fern, violet, carnation, rose and students' houses; the old Durfee range of 7,400 square feet, devoted to the growing of decorative, conservatory and bedding plants and chrysanthemums; one house of 3,200 square feet, suitable for propagating work and general plant culture; and approximately 2,200 square feet in cold frames and hotbeds.

In addition, the department has 2 acres of land used for the summer culture of carnations, violets, gladioli, dahlias, sweet peas, bedding plants, etc. This also includes a small garden of about 4,700 square feet devoted to the culture of annuals. A large collection of biennials and herbaceous perennials is maintained and is being enlarged from year to year; at the present time the collection consists of several hundred species and varieties, and provides an excellent opportunity for the study of garden flowers.

Elective Courses.

50. **I. GREENHOUSE MANAGEMENT.** — For juniors; seniors may elect. Designed to familiarize students with the methods followed in the management of greenhouse crops; students are instructed in the practical operations of watering, potting, fumigating, ventilating and in the methods of propagation of plants. In addition the use of cut flowers and plants in decorative work, arrangement of flowers in baskets, designs, vases, table and home decorations are considered. Students are expected to arrange their hours according to the needs of the work.

2 class hours.

1 4-hour laboratory period, credit, 4.

Professor THAYER.

Prerequisite, Horticulture 27.

51. **II. GREENHOUSE MANAGEMENT.** — For juniors; seniors may elect Continuation of Course 50.

2 class hours.

1 4-hour laboratory period, credit, 4.

Professor THAYER.

Prerequisite, Floriculture 50.

52. **III. GREENHOUSE MANAGEMENT.** — For juniors; seniors may elect. A continuation of Courses 50 and 51.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Professor THAYER.

Prerequisite, Floriculture 51.

53. **I. GREENHOUSE CONSTRUCTION.** — For juniors; seniors may elect. The location, arrangement, construction, cost, heating and ventilating of greenhouse structures; also the drawing of plans and drafting of specifications for commercial houses and private ranges. Such practical work as glazing, the construction of concrete benches and cold frames is included in this course.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor THAYER.

Prerequisite, should be taken with Floriculture 50.

54. **II. GREENHOUSE CONSTRUCTION.** — For juniors; seniors may elect. A continuation of Course 53.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor THAYER.

Prerequisite, Floriculture 53.

75. **I. COMMERCIAL FLORICULTURE.** — Seniors. A detailed study of the methods of propagation, culture and marketing of the important commercial crops, including both cut flowers and plants. The lectures are supplemented with textbooks and assigned reading.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor THAYER.

Prerequisite, Floriculture 52.

76. **II. COMMERCIAL FLORICULTURE.** — Seniors. As stated under Course 75.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor THAYER.

Prerequisite, Floriculture 75.

79. **III. COMMERCIAL FLORICULTURE.** — Seniors. As stated under Course 75.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor THAYER.

Prerequisites, Floriculture 76.

77. **II. CONSERVATORY PLANTS.** — Seniors. A study of the tropical and subtropical foliage and flowering plants used in conservatory work; methods of propagation, culture, use and arrangement. The lectures are supplemented with assigned readings.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor THAYER.

Prerequisite, Floriculture 75.

78. **III. GARDEN FLOWERS AND BEDDING PLANTS.** — Juniors and seniors. Familiarizes the student with those annuals, herbaceous perennials, bulbs and bedding plants that are valuable for use in floricultural or landscape gardening work. Methods of propagation, culture and uses of the various plants are considered. The lectures are supplemented with assigned readings.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor THAYER.

80. **III. SEMINAR.** — For seniors majoring in floriculture only. Advanced study of subjects pertaining to commercial floriculture or private garden work. All students electing this work are assigned a specific problem, and pursue study in these problems by reading and research. No regular lectures are given, but seminars are conducted each week. A satisfactory report of the results must be presented.

2 to 6 laboratory hours.

Not to exceed 3 credits.

Professor THAYER.

Forestry.

Professor GROSE.

The forestry major is designed to give a grounding in the branches of natural science upon which forest development is based. It continues, further, to give a knowledge of such practical forestry details as the distinguishing characteristics of the various species of trees and commercial lumber, the principles of silviculture, forest management, forest utilization, and forest nursery practice.

The department has an unusually complete equipment of the various instruments used in forest mensuration, forest mapping and engineering, timber estimating, log scaling, board measuring, etc.; and a large assortment of boards illustrative of the various commercial woods found in the lumber markets. The State Forest Nursery, comprising 6 acres of land and containing, approximately, 5,000,000 trees, transplants and seedlings, is on the college farm. Forests containing every variety of tree common to New England are within walking distance of the college. The college campus affords an arboretum containing a large number of trees not native to New England. The Mount Toby Demonstration Forest has an area of approximately 750 acres, and contains the various types of forest growth found throughout the State. It serves as a field laboratory in which students have the privilege of working out problems in silviculture, forest mensuration and management. Improvement cuttings, cuttings for utilization, and forest plantings are conducted by the department.

Elective Courses.

50. **I. DENDROLOGY.** — For juniors; seniors may elect. During the first part of the term frequent field trips are made to identify and study the habits of our native forest trees. Later, the classification, range, distribution, forest habits, quality, uses and identification of wood of the commercial timber trees of the United States is studied. Lectures, recitations, laboratories or field work at option of instructor.

3 2-hour laboratory periods, credit, 3.
Professor GROSE.

51. **II. WOOD TECHNOLOGY.** — For juniors; seniors may elect. A study of the commercial woods found in the lumber markets, methods of identification, uses, strength values, technical qualities, decay and methods of preservation.

1 class hour.

2 2-hour laboratory periods, credit, 3.
Professor GROSE.

52. **III. PRINCIPLES OF FORESTRY.** — For juniors; seniors may elect. A lecture course for the purpose of giving a general view of the whole field of forestry and what forestry attempts to accomplish and has accomplished. Not required of students who propose to major in forestry.

2 class hours.

Credit, 2.
Professor GROSE.

53. **III. SILVICULTURE.** — For juniors; seniors may elect. Factors influencing forest growth; forest types; silvicultural systems; care and protection of forests; forest description; forest nursery practice and forest planting.

1 class hour.

1 4-hour laboratory period, credit, 3.
Professor GROSE.

Prerequisite, Forestry 50.

54. **IV. ARBORICULTURE.** — For juniors; seniors may elect. Deals with problems of shade tree propagation, protection and repair; the choice and grouping of species; shade tree laws. Assigned readings.

120 hours' field work, credit, 5.
Professor GROSE.

75. **I. FOREST MENSURATION.** — For seniors; juniors may elect. Methods of determining the volume of trees, logs and entire forests. Methods of computing volume tables, tree and forest growth and yield tables. Timber estimating.

3 class hours.

72 hours' field work, credit, 5.
Professor GROSE.

78. **III. SEMINAR — REPORT.** — Seniors. This may involve research, laboratory or field work in the investigation of some subject, together with a review of the literature relating to it and an original written report evidencing the results. Subject to be chosen in conference with Professor Grose.

6 laboratory hours, credit, 3.
Professor GROSE.

Horticultural Manufactures.

Professor CHENOWETH, Mr. ROBERTSON.

The courses aim to give a practical knowledge of the problems connected with food preservation. Emphasis is placed upon the conservation of the cheaper grades of fruits and vegetables, to the end that the whole crop may be marketed at a profit and that wholesome food products may result from what would otherwise be lost. The social and economic values of this work are constantly emphasized.

The department occupies three laboratory rooms in Flint Laboratory, two in Fisher Laboratory, with offices in Wilder Hall and French Hall. The general equipment of the department, both for the use of students and for manufacturing purposes, may be grouped under the following heads: —

1. *Canning.* — A modern canning outfit, including both steam-pressure cookers and hot-water baths, hand and power can sealers, peeling and slicing machines, a string-bean cutter, heat-penetration thermometers, electric incubator and a large assortment of all types of home canning equipment.

2. *Evaporation.* — Two small orchard evaporators, a tunnel drier, peeling machines, slicers and a general assortment of driers adapted to home evaporation.

3. *Fruit Juices, Butters, etc.* — A hand cider mill, a motor-driven hydraulic press, a steam-jacketed kettle, an apple-butter cooker, and cider and vinegar testing apparatus.

Elective Courses.

75. **I. HORTICULTURAL MANUFACTURES.** — For seniors and graduate students. A practical course in food preservation dealing primarily with fruits and vegetables. The canning of fruits and vegetables as practiced in the home and in commercial canneries; evaporation of fruits and vegetables, the various types of equipment and methods of preparation of products. The manufacture of (a) fruit products, such as butters, jams, jellies, fruit juices, marmalades, preserves, vinegars, pastes, etc.; (b) vegetable products, as pickles, piccalilli, sauerkraut, soups, etc. Particular attention is given to study and use of all types of equipment suitable for use in the home or small factory, together with methods for testing a large variety of manufactured products. The emphasis is on canning, drying and study of equipment.

2 class hours.

3 2-hour laboratory periods per week, credit, 5.

Professor CHENOWETH.

76. **II. HORTICULTURAL MANUFACTURES.** — For seniors and graduate students. A continuation of Course 75. The emphasis in this course is placed on the manufacturing and testing of fruit and vegetable products.

1 class hour.

2 laboratory periods per week, credit, 3.

Professor CHENOWETH.

Prerequisite, Horticultural Manufactures 75.

77. **III. HORTICULTURAL MANUFACTURES.** — Continuation of courses 75 and 76, dealing primarily with maple products, the canning of meats and spring vegetables, and studies of special problems involved in establishing and operating home and farm factories.

2 2-hour periods per week, credit, 3.

Professor CHENOWETH.

Horticulture.

Professor WAUGH, Assistant Professor THOMPSON, Assistant Professor ROGERS.

The general subject of horticulture divides naturally into subjects of pomology, floriculture, forestry, landscape gardening and vegetable gardening. A number of courses relate to more than one of these subjects, and are therefore grouped here under the general designation of horticulture.

Required Course.

1. **I. HORTICULTURE.** — Freshmen. Given as part of the freshman agriculture and horticulture.

Elective Courses (General).

27. **III. NURSERY PRACTICE.** — For sophomores; juniors and seniors may elect. Treats of the fundamental methods of plant propagations by seeds, cuttings, budding, grafting, etc. Lectures and practicums.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor THOMPSON.

50. **I. PLANT MATERIALS.** — For juniors; seniors may elect. Aims to make the student familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor THOMPSON.

Prerequisite, Horticulture 27.

51. **III. PLANT MATERIALS.** — For juniors; seniors may elect. A continuation of Course 50, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor THOMPSON.

Prerequisite, Horticulture 50.

Landscape Gardening.

Professor WAUGH, Assistant Professor HARRISON.

The purposes of the courses are: (1) to train men for the profession in all its branches. As a rule graduates should first enter the employ of established landscape architects, nurserymen or park superintendents, and after an apprenticeship of several years those who have the requisite technical and business ability may set up for themselves. (2) To train men for public-service work in national, State and municipal parks and forests. (3) To train men for country planning, this function being exercised through various public institutions and organizations. (4) To train teachers and extension workers in lines of landscape gardening and civic improvement. (5) To give a broad and liberal general education stressing the fundamental principles of art.

The department has large, well-lighted drafting rooms, with necessary equipment, such as planimeters, eidograph, pantograph, blue-printing outfit, etc.; and a complete outfit of surveying instruments, including transits, levels, plane tables, prismatic compasses, hand levels, etc. The college campus presents an unusually good collection of the plant materials used in landscape gardening.

Elective Courses.

50. **I. MAPPING AND TOPOGRAPHY.** — Juniors. Reconnaissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected designs of leading landscape gardeners; grade design, road design and field work. Must be followed by Course 51.

2 2-hour laboratory periods; 2 3-hour laboratory periods, credit, 5.

Assistant Professor HARRISON.

Prerequisites, Mathematics 26 and 27, Drawing 25, 26 and 27, Horticulture 27.

51. **II. ELEMENTS OF LANDSCAPE GARDENING.** — Juniors. As stated under Course 50.

3 3-hour laboratory periods, credit, 4.

Assistant Professor HARRISON.

Prerequisite, Landscape Gardening 50.

52. **III. GENERAL DESIGN.** — Juniors. Field notes; examination of completed works and those under construction; design of architectural details, planting plans, gardens, parks and private grounds; written reports on individual problems. Must be followed by Course 53.

2 2-hour laboratory periods; 2 3-hour laboratory periods, credit, 5.

Assistant Professor HARRISON.

Prerequisites, Landscape Gardening 50 and 51, and either plant materials (Horticulture 50 and 51) or advanced mathematics.

75. **I. THEORY OF LANDSCAPE ART.** — For seniors and graduates. The general theory and applications of landscape study, including a brief history of the art.

3 class hours.

Credit, 3.

Professor WAUGH.

76. **II. CIVIC ART.** — Seniors. The principles and applications of modern civic art, including city planning, city improvement, village improvement and rural improvement, with special emphasis upon country planning. Must be followed by Course 77.

3 3-hour laboratory periods, credit, 4.

Professor WAUGH.

Prerequisite, Landscape Gardening 53.

77. **III. COUNTRY PLANNING.** — Seniors. As stated under Course 76.

3 3-hour laboratory periods, credit, 4.

Professor WAUGH.

Prerequisite, Landscape Gardening 76.

78. **III. ARCHITECTURE.** — Alternating with Course 79; given in 1918-19. Juniors and seniors. The history of architectural development, the different historic types, with special reference to the underlying principles of construction and design and their relations to landscape design. Illustrated lectures, conferences, practice in designing.

3 class hours.

Credit, 3.

Assistant Professor HARRISON.

79. **III. CONSTRUCTION AND MAINTENANCE.** — Alternating with Course 78; given in 1919-20. Juniors and seniors. Detailed instruction in methods of construction and planting in carrying out plans, in organization, reporting, accounting, estimating, etc.; maintenance work in parks and on estates, its organization, management, cost, etc.

3 class hours.

Credit, 3.

Assistant Professor HARRISON.

80. **I. THEORY OF DESIGN.** — Juniors. As stated under Course 52. [Will be given in the summer term when that is established; meantime, will be given in term **I**, senior year.]

120 laboratory hours, credit, 4.

Professor WAUGH.

Prerequisite, Landscape Gardening 52.

81. **II. ESTATE DESIGN.** Credit, 4.

Assistant Professor HARRISON.

82. **III. PARK DESIGN.** Credit, 4.

Assistant Professor HARRISON.

Pomology.

Professor SEARS, Assistant Professor DRAIN, Assistant Professor FRENCH, Assistant Professor GOULD.

The object of the courses is to give a training which shall be thoroughly practical and yet scientific. This will fit the men to enter the field of practical fruit-growing, or it will furnish an excellent foundation for further study.

The department has 50 acres in fruit plantations. The apple orchards comprise about 35 acres, and there are blocks of pears, peaches, plums and cherries. In small fruits there are plantings of strawberries, raspberries, blackberries, currants and gooseberries. There are three vineyards, with a total area of 5 acres, in which the leading varieties and the principal types of pruning and training are represented. In these plantations are 50 varieties of grapes, representing three native American species and many hybrids; 20 varieties of peaches; 20 varieties of pears; 25 of plums, including five species and many hybrids; and 100 varieties of apples.

The department has an excellent equipment of spraying and dusting machinery, including various styles and sizes of power sprayers, and many types of barrel pumps and smaller sprayers. There is also an excellent assortment of orchard tools, including plows, harrows, fertilizer sowers, etc.

Fisher Laboratory is one of the best planned and equipped packing and storage plants in the United States. It includes six refrigerated rooms; four storage rooms not refrigerated; one large laboratory room and one classroom, besides ample storage room for fruit packages and equipment. The equipment for the building itself includes four types of apple sizers; packing tables and box and barrel presses of various types, besides all kinds of packages and the smaller equipment necessary for thoroughly modern work in grading and packing fruit. The department is equipped with lockers and with pruning and other tools for the use of students in laboratory work, which is made a leading feature in all the courses in pomology.

Elective Courses.

50. I. PRACTICAL POMOLOGY. — For juniors; seniors may elect. A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of nursery stock, pruning, culture of orchards, orchard fertilizers, cropping orchards, etc. Lectures, supplemented with text and reference books; field and laboratory exercises.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor SEARS.

Prerequisite, Horticulture 27.

51. II. PRACTICAL POMOLOGY. — For juniors; seniors may elect. As stated under Course 50.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor SEARS.

Prerequisite, Pomology 50.

52. III. PRACTICAL POMOLOGY. — For juniors; seniors may elect. As stated under Course 50.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor SEARS.

Prerequisite, Pomology 51.

53. IV. (Summer.) SMALL FRUITS. — For juniors; seniors may elect. The growing, harvesting, marketing and storing of small fruits, including raspberries, blackberries, strawberries, currants, gooseberries and grapes, together with thinning, spraying, picking and marketing of tree fruits at the college orchards and in private commercial orchards.

120 laboratory hours, credit, 5.

The DEPARTMENT.

75. I. SYSTEMATIC POMOLOGY. — Seniors. A study of the varieties and nomenclature of the different fruits, with critical descriptions; special reference given to relationships and classification. Lectures, laboratory and field exercises.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor DRAIN.

Prerequisite, Pomology 52.

76. **II. SYSTEMATIC POMOLOGY.** — Seniors. As stated under Course 75.
1 class hour. 2 2-hour laboratory periods, credit, 3.

Assistant Professor DRAIN.

Prerequisite, Pomology 75.

77. **I. COMMERCIAL POMOLOGY.** — Seniors only, majoring in pomology. The picking, handling, storing and marketing of fruits, including a discussion of storage houses, fruit packages, methods of grading and packing. Especial emphasis is placed upon laboratory and field work, where the student is given actual practice in the picking and packing of all the principal fruits.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Assistant Professor GOULD.

Prerequisite, Pomology 52.

78. **III. SPRAYING.** — Seniors. A study of (a) spraying materials, their composition, manufacture and preparation for use; the desirable and objectionable qualities of each material, formulas used, cost, tests of purity. (b) Spraying machinery, including all the principal types of pumps, nozzles, hose and vehicles; their structure and care. (c) Orchard methods in the application of the various materials used, with the important considerations for spraying each fruit and for combating each orchard pest. This course is designed especially to familiarize the student with the practical details of actual spraying work in the orchard. Spray materials are prepared, spraying apparatus is examined and tested, old pumps are overhauled and repaired, and the actual spraying is done in the college orchards and small-fruit plantations.

1 class hour. 2 2-hour laboratory periods, credit, 3.

The DEPARTMENT.

Prerequisite, Pomology 52.

79. **III. GENERAL POMOLOGY.** — For seniors; juniors may elect. Planned to meet the needs of students who cannot devote more than one term to the subject but who want a general knowledge of fruit growing. Consists of lectures and laboratory exercises on such topics as choosing the locations, kinds and varieties of fruits to grow, securing and setting the plants, care and cultivation, pruning, spraying, pests, harvesting and storing.

2 class hours. 1 2-hour laboratory period, credit, 3.

The DEPARTMENT.

80. **I. SEMINAR.** — For seniors majoring in pomology. Advanced study of problems relating to the business of fruit growing. Each student is assigned a major and a minor problem in lines of work in which he is particularly interested. He pursues his studies both by reading and research, and the materials obtained will be worked into theses which are presented to the seminar for discussion. No lectures are given, but seminar meetings are held for one period each week.

Credit, 1.

Professor SEARS.

81. **II. SEMINAR.** — For seniors majoring in pomology. A continuation of Course 80. One seminar meeting each week.

Credit, 1.
Professor SEARS.

82. **III. SEMINAR.** — For seniors majoring in pomology. A continuation of Course 81. One seminar meeting each week.

Credit, 1.
Professor SEARS.

Vegetable Gardening.

Professor TOMPSON, Professor DACY, Mr. HARRIS.

The courses cover the principles and practices of the commercial production of vegetables in the open, and the forcing of vegetables in cold frames, hotbeds and greenhouses. They are designed for students who wish to engage in the business for themselves or for others, or who wish to become teachers or investigators in the more technical phases of the subject.

The department has 12 acres of land, greenhouses, hotbeds and cold frames, with modern equipment devoted to the production of a wide variety of crops. These afford excellent subject-matter for study, and opportunity for close contact with the actual problems of the business.

Elective Courses.

50. **III. GENERAL VEGETABLE GARDENING.** — Juniors; seniors may elect. A general course for students not specializing in vegetable gardening. Designed to teach the fundamentals of vegetable gardening, soils, fertilizers, garden crops, general methods of management.

2 class hours. 1 2-hour laboratory period, credit, 3.
Professor DACY.

51. **I. PRACTICAL VEGETABLE GARDENING.** — Juniors; seniors may elect. A study of the principles of vegetable gardening. Deals with such questions as the selection of a location; soils, manures and fertilizers, green manure and cover crops; seeds and seeding; the construction and management of hotbeds and cold frames; garden planning, planting, tillage, irrigation; control of insects and diseases; harvesting, marketing and storing. Includes a detailed study of the cultural requirements of the common vegetable crops, and the principles of rotation and double cropping. Text and reference books. Laboratory and field exercises.

2 class hours. 1 2-hour laboratory period, credit, 3.
Professor DACY.

Prerequisite, Horticulture 27.

52. **II. PRACTICAL VEGETABLE GARDENING.** — Juniors; seniors may elect. As stated under Course 51.

2 class hours. 1 2-hour laboratory period, credit, 3.
Professor DACY.

Prerequisite, Vegetable Gardening 51.

53. **III. PRACTICAL VEGETABLE GARDENING.** — Juniors; seniors may elect. As stated under Course 51.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor DACY.

Prerequisite, Vegetable Gardening 52.

75. **I. SYSTEMATIC VEGETABLE GARDENING.** — Seniors. Includes the systematic study of varieties, types and strains of the leading vegetable crops; the establishing of types, determination of quality of varieties; seed growing, variety improvement, roguing, seed harvesting, curing and storing.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor DACY.

Prerequisite, Vegetable Gardening 54.

76. **II. GREENHOUSE CONSTRUCTION AND VEGETABLE FORCING.** — Seniors. A study of types, materials, construction, location, arrangement, capacity and cost of greenhouses for growing vegetables. A brief consideration of the heating plant, — the type, installation, piping and management; also the study of greenhouse vegetable crops and their production as practiced by commercial growers.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor DACY.

Prerequisite, Vegetable Gardening 75.

77. **III. COMMERCIAL VEGETABLE GROWING.** — Seniors. A consideration of vegetable growing as a business. A study of this specialized type of farming, including places where developed, types, extent, economic importance, capitalization, equipment and other fundamental problems of commercial vegetable gardening. Students assist in the planning and operation of a typical market-gardening area. Visits are made to market-gardening and truck-gardening farms.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor DACY.

Prerequisite, Vegetable Gardening 76.

78. **I. SEMINAR.** — For seniors majoring in vegetable gardening. Each student is assigned problems relating to the business of vegetable gardening. Reports on the work on these problems are made each week to the seminar, and the results presented as a thesis.

Credit, 1.

Professors TOMPSON and DACY.

79. **II. SEMINAR.** — For seniors majoring in vegetable gardening. A continuation of Course 78. One seminar meeting each week.

Credit, 1.

Professors TOMPSON and DACY.

80. **III. SEMINAR.** — For seniors majoring in vegetable gardening. A continuation of Course 79. One seminar meeting each week.

Credit, 1.

Professors TOMPSON and DACY.

Drawing.

Elective Courses.

25.¹ **I. FREE-HAND DRAWING.** — For sophomores; juniors and seniors may elect. Lettering; free-hand perspective; sketching from type models, leaves, flowers and trees, houses, etc.; laying flat and graded washes in water colors; water-color rendering of leaves, flowers and trees; conventional coloring and map rendering in water colors; conventional signs and mapping in ink.

3 2-hour laboratory periods, credit, 3.

26.¹ **II. MECHANICAL DRAWING.** — For sophomores; juniors and seniors may elect. Inking exercises; geometric problems; projection; intersections; isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Students should have preparation in plane and solid geometry.

3 2-hour laboratory periods, credit, 3.

27.¹ **III. MECHANICAL DRAWING.** — For sophomores; juniors and seniors may elect. As stated under Course 26.

3 2-hour laboratory periods, credit, 3.

Prerequisite, Drawing 26.

¹ Given by Assistant Professor Harrison.

DIVISION OF SCIENCE.

Professor FERNALD.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Botany.

Professor OSMUN, Professor ANDERSON, Assistant Professor CLARK, Assistant Professor McLAUGHLIN, Assistant Professor TORREY.

A knowledge of the principles of plant life is fundamental in agricultural education. The required courses in botany are planned with this and the general educational value of the subject in view. Elective courses are of two types: (1) those which have for their chief aim the direct support of technical courses in agriculture and horticulture, and (2) those providing broader, more intensive training in the science. Courses in the second group may lead, when followed by postgraduate study, to specialization in the field. They also furnish excellent training for those specializing in other sciences and in scientific agriculture. In all undergraduate courses the relation of the science of botany to agriculture is emphasized.

The department occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. The building has two lecture rooms with seating capacity of 154 and 72, respectively; one seminar and herbarium room; large laboratories for general and special work; and smaller rooms for advanced students. A glass-enclosed laboratory for plant physiology adjoins the main building and provides unusual facilities for the study of phenomena of plant life. In addition, a greenhouse 28 by 70 feet is connected with the building. This is for experimental work in plant pathology and physiology, and for growing plants needed for instruction. The experiment station laboratories devoted to botanical research are in this building.

The laboratories and lecture rooms are of modern construction, finely lighted, and equipped with compound and dissecting microscopes, microtomes, paraffin and drying ovens, physiological and other apparatus, and a large collection of charts. The herbarium contains about 20,000 sheets of seed plants and ferns, 1,200 sheets of liverworts and mosses, and 25,000 specimens of fungi. Facilities and equipment for the study of plant physiology and pathology are excelled in few other institutions.

Required Courses.

3. **III. INTRODUCTORY BOTANY.** — Freshmen. Presents the seed plants as plastic organisms molded by their environment. Also introduces the student to methods of identifying and classifying plants.

An herbarium, illustrative of systematic, ecological and economic features, is started in the spring, but need not be presented until fall when credit is given in Course 25. This makes it possible for the interested student to familiarize himself with the flora of the full growing season.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor TORREY.

25. **I. INTRODUCTORY BOTANY.**—Sophomores. The anatomy and physiology of the seed plants (Phanerogamia), with a brief summary of the lower forms of plant life. The herbarium started in connection with Botany 3 is presented as part of this course.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor TORREY.

Prerequisite, Botany 3.

Elective Courses.

26. **II. MORPHOLOGY AND TAXONOMY OF THE LOWER PLANTS (CRYPTOGAMIA).**—Sophomores. Systematic study of typical forms of bacteria, algæ, fungi, lichens, mosses, ferns. (Courses 3, 25 and 26 constitute a general elementary course in botany, and are required of all students who major in the subject.)

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professors OSMUN and TORREY.

Prerequisite, Botany 25.

27. **III. THE VASCULAR PLANTS.**—For sophomores; juniors and seniors may elect. Continues the work of Botany 26, but deals with the higher plants, such as ferns and fernworts, gymnosperms and angiosperms. The department possesses a unique collection of lantern slides and microscopical preparations for use in this course.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor TORREY.

Prerequisite, Botany 26.

50. **I. DISEASES OF CROPS.**—For juniors; seniors may elect. The lectures are general and are taken by all who elect the course, but in order to permit students to specialize on the diseases of crops most closely related to their majors or in which they are most interested, the course is divided for laboratory work into the following sections: (I) diseases of truck and field crops; (II) diseases of floricultural crops and ornamentals; (III) diseases of fruit crops; (IV) diseases of shade and forest trees. One, two or three laboratory sections may be taken.

1 class hour.

1, 2 or 3 2-hour laboratory periods, credits, 2, 3 or 4.

Assistant Professor McLAUGHLIN.

Prerequisites, Botany 3 and 25.

51. **II. DISEASES OF CROPS.**—For juniors; seniors may elect. As stated under Course 50.

1 class hour.

1, 2 or 3 2-hour laboratory periods, credits, 2, 3 or 4.

Assistant Professor McLAUGHLIN.

Prerequisite, Botany 50.

52. **I. SYSTEMATIC MYCOLOGY.**—For juniors; seniors may elect. Morphology and development of typical species representing the orders and families of fungi; practice in identification, collection and preservation of fungi; study

of systems of classification; collateral reading. A prerequisite of the senior course in plant pathology, but open to all.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor ANDERSON.

Prerequisite, Botany 26.

53. **II. SYSTEMATIC MYCOLOGY.** — For juniors; seniors may elect. As stated under Course 52.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor ANDERSON.

Prerequisite, Botany 52.

54. **III. SYSTEMATIC MYCOLOGY.** — For juniors; seniors may elect. As stated under Course 52.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor ANDERSON.

Prerequisite, Botany 53.

55. **I. PLANT HISTOLOGY.** — For juniors; seniors may elect. Comparative study of the tissues of plants; training in histological methods, including the use of precision microtomes, methods of killing, fixing, sectioning, staining and mounting; collateral reading and conferences. This course offers valuable training in preparation for further work in botany.

3 2-hour laboratory periods, credit, 3.

Professor OSMUN and Assistant Professor McLAUGHLIN.

Prerequisites, Botany 3 and 25.

56. **II. PLANT HISTOLOGY.** — For juniors; seniors may elect. As stated under Course 55.

3 2-hour laboratory periods, credit, 3.

Professors OSMUN and McLAUGHLIN.

Prerequisite, Botany 55.

58. **I. SYSTEMATIC BOTANY OF THE HIGHER PLANTS.** — For juniors; seniors may elect. An intensive study of gymnosperms and angiosperms. Lectures deal with the interrelations of the flowering plants and with their ecology, distribution and economic importance. Laboratory work consists of a critical study of types from the most important natural plant families. Particular emphasis is laid on the flora of Massachusetts. The department herbarium and greenhouses supply material of important tropical forms for study.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Assistant Professor TORREY.

59. **II.** For juniors; seniors may elect. As stated under Course 58.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Assistant Professor TORREY.

75. **I. PLANT PATHOLOGY.** — Seniors. Comprehensive study of diseases of plants; training in laboratory methods and technique, including culture work and artificial inoculation of hosts; miscellaneous diagnosis; study of literature and representative life histories of pathogens. Prepares for civil service, experiment station and college work.

1 class hour.

4 2-hour laboratory periods, credit, 5.

Professors OSMUN and ANDERSON.

Prerequisite, Botany 54.

76. **II. PLANT PATHOLOGY.** — Seniors. As stated under Course 75.

1 class hour.

4 2-hour laboratory periods, credit, 5.

Professors OSMUN and ANDERSON.

Prerequisite, Botany 75.

77. **III. PLANT PATHOLOGY.** — Seniors. As stated under Course 75.

1 class hour.

4 2-hour laboratory periods, credit, 5.

Professors OSMUN and ANDERSON.

Prerequisite, Botany 76.

78. **I. PLANT PHYSIOLOGY.** — Seniors. Study of the factors and conditions of (a) Plant Nutrition, including the taking up of water and mineral substances, the assimilation of carbon and nitrogen, and the release of energy due to the processes of dissimilation; (b) Plant Growth, including the influence of internal and external factors on growth, the development of reproductive and vegetative organs, and touching on plant inheritance and the origin of new varieties; (c) Plant Movements, including those due to the taking up of water, and those movements of both motile and fixed forms in response to external stimuli. Special emphasis is laid on the development of skill in the manipulation of apparatus in the laboratory; weekly conferences are held at which students report on assignments.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Assistant Professor CLARK.

Prerequisites, Botany 26 and Chemistry 51.

79. **II. PLANT PHYSIOLOGY.** — Seniors. As stated under Course 78.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Assistant Professor CLARK.

Prerequisite, Botany 78.

80. **III. PLANT PHYSIOLOGY.** — Seniors. As stated under Course 78.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Assistant Professor CLARK.

Prerequisite, Botany 79.

82. **II. CYTOLOGY AND EMBRYOLOGY.** — Seniors. Morphology and physiology of the cell; cell-division; embryonal development.

3 2-hour laboratory periods, credit, 3.

Assistant Professor McLAUGHLIN.

Prerequisites, Botany 26 and 55.

83. **III.** CYTOLOGY AND EMBRYOLOGY. — Seniors. As stated under Course 82.

3 2-hour laboratory periods, credit, 3.
Assistant Professor McLAUGHLIN.

Prerequisite, Botany 82.

86. **I.** 87. **II.** 88. **III.** SEMINAR. — For seniors and graduate students. Presentation and discussion of important current botanical papers. A major requirement.
1 class hour.

Credit, 1.
The DEPARTMENT.

General and Agricultural Chemistry.

Professor LINDSEY, Professor WELLINGTON, Professor CHAMBERLAIN, Professor PETERS,
Professor ———, Assistant Professor SEREX.

In teaching the courses in chemistry, emphasis is laid on both their educational and their vocational value. The courses in the freshman year deal with fundamental principles, and give the student such an understanding of the subject as will enable him to apply it in farm practice. The more advanced courses, including quantitative analysis and organic, physiological and physical chemistry, are for those who intend to become teachers and workers in the allied sciences, or who desire to follow agricultural chemistry as a vocation. Advanced training is given by means of postgraduate courses (see Graduate School).

Those completing the undergraduate courses are fitted for positions in the agricultural industries, — fertilizer, feed and insecticide manufacture, — as well as in other lines of industry, and in the State experiment stations and in commercial laboratories. Postgraduate students are prepared for positions as teachers in high schools and colleges, and for more advanced positions in industry and in the experiment stations.

An entire building is devoted to the needs of the department. The basement is used for the storage of apparatus and chemicals. The first floor contains laboratories for organic, physiological and physical chemistry, and qualitative analysis. The second floor is occupied by the general lecture room, the reading room, offices for the several members of the staff, and laboratories for analytical chemistry. The third floor has desk room and hoods sufficient to accommodate 90 students at one time in general chemistry. On this floor is also a lecture room seating 56 students.

The entire laboratory is well equipped with the necessary apparatus and chemicals for all students who desire to perfect themselves as expert chemists, or who wish to study chemistry as a supplement to some other kind of practical or scientific work. The equipment includes a valuable and growing collection of specimens and samples of minerals, soils, raw and manufactured fertilizers, foods, milk products, fibers, various other vegetable and animal products, and artificial preparations of mineral and organic compounds; and also a series of preparations for illustrating the various stages of different manufactures from raw material to finished product.

Required Courses.

1. **I. GENERAL CHEMISTRY.** — Freshmen. An introduction to the fundamental chemical laws, together with a study of the common acid-forming elements and their compounds. Textbook, Kahlenberg's "Outlines of Chemistry." This course is for those students who do not present chemistry for entrance, and who begin the subject in college.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professors PETERS and SEREX.

2. **II. GENERAL CHEMISTRY.** — Freshmen. A continuation of Course 1. A study of metals and their compounds. The laboratory work is the same as described under Course 4.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor PETERS.

3. **III. INORGANIC AGRICULTURAL CHEMISTRY.** — Freshmen. As stated under Course 5, **II.**

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor SEREX.

4. **I. ADVANCED GENERAL CHEMISTRY.** — Freshmen. A review of the fundamental chemical laws, together with the common acid and base-forming elements and their compounds. Textbook, Kahlenberg's "Outlines of Chemistry." The laboratory work takes the synthetic form. Substances of agricultural importance are prepared in quantity and studied in detail by the student. These include ammonium sulfate, superphosphate, muriate and sulfate of potash, arsenate of lead, Paris green, Bordeaux mixture, lime-sulfur and emulsions.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor SEREX.

Prerequisite, Entrance Chemistry.

5. **II. INORGANIC AGRICULTURAL CHEMISTRY.** — Freshmen. A study of the chemical composition, properties and reactions of soils, fertilizers, fungicides and insecticides. The laboratory work is divided into three parts: (a) qualitative examination of soil, plant ash and superphosphate; (b) approximate quantitative determination of moisture, ash, carbonic acid, phosphoric acid, potash, etc.; (c) special work on retention of salts by soil, leaching of lime from the soil by carbonated water, etc.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor SEREX.

6. **III. ORGANIC AGRICULTURAL CHEMISTRY.** — Freshmen. Elective for sophomores who do not take it as freshmen. Embraces the study of the most important groups of organic compounds of plants and animals, the composition of plants, the chemistry of plant growth, plants as food and as industrial material, the composition of animals, the chemistry of digestion, also the study of some of the products related to plants and animals, such as milk, butter, cheese, sugar and alcohol. The treatment of the subject is general,

avoiding (so far as possible) complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the general chemistry of plants and animals and agricultural processes and products.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor CHAMBERLAIN.

Elective Courses.

25. **I. QUALITATIVE ANALYSIS.** — *Basic.* — Sophomores. The systematic analysis of metallic salts, presented from the ionic viewpoint. A close study of the tests used in the separation and identification of the metals; he then applies these tests to unknown mixtures. Text, Medicus' "Qualitative Analysis," with Stieglitz's "Qualitative Analysis" and Gooch & Browning's "Qualitative Analysis" for reference. This course should be taken by all intending to follow chemistry as a vocation.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor SEREX.

Prerequisite, Chemistry 3 or 6.

26. **II. QUALITATIVE ANALYSIS.** — *Acidic.* — Sophomores. A continuation of Course 25.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor SEREX.

27. **III. QUANTITATIVE ANALYSIS.** — For sophomores; juniors and seniors may elect. Includes the gravimetric and volumetric determinations of some of the commoner metals and non-metals. Talbot's "Quantitative Chemical Analysis" is used as a text.

1 class hour.

2 4-hour laboratory periods, credit, 5.

Professors WELLINGTON and PETERS.

Prerequisite, Chemistry 25. Course 26 is prerequisite for those majoring in chemistry.

51. **I. ORGANIC CHEMISTRY.** — For juniors; seniors may elect. Consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry. Especial attention is given to those compounds which are found in agricultural products or are manufactured from them. These include alcohols, acids, esters, fats, carbohydrates and proteins. The work forms a foundation for courses in physiological chemistry and agricultural analysis, and is especially planned for those majoring in chemistry or the other sciences. Those electing Course 51 are expected to elect Course 52.

5 class hours.

2 3-hour laboratory periods, credit, 8.

Professor CHAMBERLAIN.

Prerequisites, Chemistry 3 or 6, and Chemistry 27 for those majoring in chemistry.

52. **II. ORGANIC CHEMISTRY.** — For juniors; seniors may elect. A continuation of Course 51, dealing principally with compounds of the benzene series.

5 class hours.

2 3-hour laboratory periods, credit, 8.

Professor CHAMBERLAIN.

62. **III. ADVANCED QUANTITATIVE ANALYSIS.** — For juniors; seniors may elect. Advanced work on subjects as stated under Course 27, together with the analysis of insecticides or the analysis of soils and fertilizers.

1 class hour.

2 4-hour laboratory periods, credit, 5.
Professors WELLINGTON and PETERS.

Prerequisite, Chemistry 27.

65. **III. PHYSICAL CHEMISTRY.** — For juniors; seniors may elect. A résumé of general chemistry from the viewpoint of physical chemistry, and the application of physical chemistry to agricultural chemistry.

3 class hours.

2 2-hour laboratory periods, credit, 5.
Assistant Professor SEREX.

Prerequisite, Chemistry 27.

76. **I. MILK AND BUTTER ANALYSIS.** — For seniors; juniors may elect. A study of milk and butter analytically.

1 class hour.

2 4-hour laboratory periods, credit, 5.
Professor PETERS and Assistant Professor JULIAN.

Prerequisite, Chemistry 27.

77. **II. CATTLE FEED, WATER AND MISCELLANEOUS ANALYSIS.** — For seniors; juniors may elect. The analysis of cattle feeds and water, with interpretations. Other materials may be analyzed.

1 class hour.

2 4-hour laboratory periods, credit, 5.
Professor PETERS and Assistant Professor JULIAN.

Prerequisite, Chemistry 27.

80. **I. PHYSIOLOGICAL CHEMISTRY.** — Seniors. Supplementary to Courses 51 and 52. To those who expect to take up scientific work in microbiology, botany, agronomy, animal husbandry, etc., and who have had Courses 51 and 52, it gives acquaintance with the chemistry of the physiological processes in plants and animals, by means of which some of the important organic compounds studied in Courses 51 and 52 are built up in the living organism or are used as food by it. In the lectures the study of food and nutrition as related to both human and domestic animals is the principal subject. In the laboratory experimental studies are made of the animal body and the processes and products of digestion, secretion and excretion.

3 class hours.

2 2-hour laboratory periods, credit, 5.
Professor CHAMBERLAIN.

86. **II. REVIEW OF GENERAL CHEMISTRY.** — Seniors. Primarily for students majoring in chemistry; others may elect by permission from the instructor. A knowledge of physical chemistry is desirable. The review of general chemistry is largely theoretical, using Alexander Smith's "Introduction to Inorganic Chemistry" as text.

3 class hours.

Credit, 3.
Professor PETERS.

87. **III. HISTORY OF CHEMISTRY.** — Seniors. An exposition of the development of chemical knowledge from the earliest times to the present. Although the entire history will be included, the larger portion of it will receive only brief mention in order that the questions of vital interest in modern life and industry may be studied at greater length. Particular attention will be given to the questions of plant and animal industry. Chemists are strongly advised to take this course.

3 class hours.

Credit, 3.

Professor WELLINGTON.

91. **III. SPECIAL WORK IN AGRICULTURAL CHEMICAL ANALYSIS.** — Seniors. As stated in Course 90.

10 laboratory hours, credit, 5.

Professor PETERS.

Prerequisite, Chemistry 90.

92. **II. SPECIAL WORK IN PHYSIOLOGICAL AND ORGANIC AGRICULTURAL CHEMISTRY.** — Seniors. In this course, as in Courses 90 to 95, the student may give his attention primarily to one line of chemical study. To those whose tastes and interests are in connection with the organic and physiological problems of agricultural chemistry, many subjects of study present themselves, among which may be mentioned: proteins, carbohydrates, fats, organic nitrogenous compounds in fertilizers and soils and their relation to plants, the commercial production of alcohol from agricultural products, dyes, digestion and dietary studies, the chemical study of dairy products, etc.

6 or 10 laboratory hours, credit, 3 or 5.

Professor CHAMBERLAIN.

Prerequisites, Chemistry 51, 52 and 80.

93. **III. SPECIAL WORK IN PHYSIOLOGICAL AND ORGANIC AGRICULTURAL CHEMISTRY.** — Seniors. As stated under Course 92.

10 laboratory hours, credit, 5.

Professor CHAMBERLAIN.

Prerequisite, Chemistry 92.

94. **II. SPECIAL WORK IN PHYSICAL CHEMISTRY.** — Seniors. The field of agricultural chemistry offers many problems that have been attacked through the methods of physical chemistry; such, for example, are the hydrolysis of salts and of minerals and the absorption of salts and fertilizers by soils. Each student selects one line of work and follows it through the course, repeating some of the original work.

6 or 10 laboratory hours, credit, 3 or 5.

Assistant Professor SEREX.

Prerequisite, Chemistry 65.

95. **III. SPECIAL WORK IN PHYSICAL CHEMISTRY.** — Seniors. As stated under Course 94.

10 laboratory hours, credit, 5.

Assistant Professor SEREX.

Prerequisite, Chemistry 94.

Entomology.

Professor FERNALD, Professor CRAMPTON, Assistant Professor REGAN, Assistant Professor PHILLIPS.

The introductory Courses 26 and 27, taken together, present a comprehensive view of the relation of insects to man, particularly as crop pests. The most important pests are carefully studied, together with the methods for their control. Courses 50 and 51 are arranged for special study of the pests of any one line of agricultural or horticultural occupation, selected by the student according to his plan of future work, with the intent of making him thoroughly familiar with the pests he will meet in his selected work after graduation, and the means of controlling them. The remaining courses are for the training of men as State or experiment station entomologists; for those going into the care of trees, etc., on estates, or for cities and towns; and as entomological experts, for which the demand has been very large.

Fernald Hall provides excellent lecture rooms and laboratories for this department. The laboratories are provided with individual desks, equipped with microscopes and all needed apparatus of all kinds. Dissecting microscopes, binoculars, microtomes, photographic apparatus, glassware and reagents are available for use and electric light and gas are connected with each desk. Two laboratories, one for juniors and seniors, the other for graduate students, are thus equipped. A department library containing all the more important works on insects, supplemented by others on the subject in the main library, and by the private libraries of the professors, make available more than 25,000 books and pamphlets on this subject. In addition, all the current magazines are received and their files are accessible to every one. A card catalogue giving references to the published articles on different insects contains about 65,000 cards, and is probably the largest index of its kind in the world. Spray pumps, nozzles and spraying appliances of all kinds are in use in various parts of the courses, and a large collection of insecticides is accessible for study. Photographic rooms are specially prepared for the photography of insects, and the greenhouses, gardens, orchards and the grounds of the college provide wide opportunities for the study, under natural conditions, of insect pests.

Elective Courses.

26. II. GENERAL AND ECONOMIC ENTOMOLOGY. — For sophomores; juniors and seniors may elect. For students who desire some knowledge of insects, but who cannot give more than two terms to the subject. Also serves as an introduction to the later courses for those who intend to follow entomology farther. Touches briefly upon the structure of insects so far as this is needed for such a course; deals with metamorphosis, classification to the larger groups, and discusses the most important methods and materials used for control. The greater part of the time is devoted to special study of the most important insect pests, particularly of New England, showing their modes of life, the injuries they cause, and the best methods of control. In this way the most serious pests of fruit trees, ornamental trees and shrubs, market-garden and greenhouse pests, those attacking field crops and those affecting animals and man, are treated. During the winter term and in the spring term until about the first of May instruction is given by lectures and recitations; from about the first of May field work takes the place of the lectures. In this part of the

course the students are shown how to find and recognize the work of the various insect pests which may be accessible at that season of the year, and they also make and preserve a collection of insects.

3 class hours.

Credit, 3.

Professor FERNALD.

27. **III. GENERAL AND ECONOMIC ENTOMOLOGY.** — As stated under Course 26, **II.**

2 class hours till about May 1; thereafter 2 2-hour field periods. Credit, 2.

Professors FERNALD, CRAMPTON and REGAN.

50. **I. PESTS OF SPECIAL CROPS.** — For juniors; seniors may elect. For students not majoring in entomology. The laboratory work is largely individual in this term. Accordingly, students majoring in subjects other than entomology, but who desire a more complete knowledge of the insects connected with their own major line of work, can obtain it here. A student majoring in floriculture, for example, will devote his laboratory time to a careful study of the insects injuring floricultural crops, learning how to recognize them and their work in their different stages, and the best methods for their control. Courses of this kind are available on the insects attacking field crops, market-garden crops, tree fruits, small fruits, shade trees and shrubs, flowers, forest trees, the domesticated animals, household pests and man. This work may be continued in the winter term also. (See 51, **II.**)

3 2-hour laboratory periods, credit, 3.

Professor FERNALD.

Prerequisites, Entomology 26 and 27.

51. **II. PESTS OF SPECIAL CROPS.** — As stated in 50, **I.** For students not majoring in entomology. Those who were not able to take Entomology 50 in the fall may take it here. Those who took Entomology 50 in the fall have an opportunity to continue the work during this term also.

3 2-hour laboratory periods, credit, 3.

Professor FERNALD.

52. **II. INSECTICIDES AND THEIR APPLICATION. CLASSIFICATION OF INSECTS.** — For juniors majoring in entomology. Lectures on the composition, preparation and methods of application of insecticides. Laboratory work on classification of insects, particularly those for which insecticides are used.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professors FERNALD and REGAN.

Prerequisite, Entomology 53.

53. **I. INSECT MORPHOLOGY.** — For juniors majoring in entomology. The lectures treat of the external and internal anatomy of insects, particularly of those characters used in identification, a knowledge of which is needed in the accompanying laboratory work. In the laboratory the external anatomy of the most important groups is studied, followed by the identification of insects of these groups, to show how the characters are made use of in learning the names of insects, and to teach the use of analytical keys.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Professor CRAMPTON.

Prerequisites, Entomology 26 and 27.

54. **I. INSECT CLASSIFICATION.** — For juniors majoring in entomology. Systematic identification of insects of various groups. Study of various entomological publications and methods of finding the literature on any insect.

3 2-hour laboratory periods, credit, 3.

Assistant Professor REGAN.

Prerequisite, Entomology 53.

56. **II. PESTS OF SPECIAL CROPS.** — For juniors majoring in entomology. Individual laboratory work on the most important insect pests of this country, and the preparation and presentation of bulletin material on them.

3 2-hour laboratory periods, credit, 3.

Professor FERNALD.

55. **III. ECONOMIC ENTOMOLOGY.** — For juniors majoring in entomology. Continuation of lectures on insecticides; laboratory work on the identification of insect pests, the relations of insects to disease.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professors FERNALD, CRAMPTON and REGAN.

Prerequisites, Entomology 52 and 53.

75. **III. FOREST AND SHADE-TREE INSECTS.** — For juniors; seniors may elect. The lecture work deals with the principles and methods of controlling insects which attack forests and forest products, shade trees, etc. The laboratory periods are devoted to a study of the more important species, their identification, biology and specific control measures. Field work supplements laboratory study if time permits.

1 class hour.

3 2-hour laboratory or field periods, credit, 4.

Assistant Professor REGAN.

Prerequisites, Entomology 26 and 27; 53 and 54 desirable.

76. **I. ADVANCED ENTOMOLOGY.** — For seniors. Studies on insect bionomics; scale insects, their structure, habits, methods of mounting, identification, etc.; studies of the animals not insects with which entomologists are expected to deal.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Professors CRAMPTON and REGAN.

Prerequisite, Entomology 55.

77. **II. ADVANCED ENTOMOLOGY.** — Studies of the life history, habits and methods of control of the important insect pests of the United States; recognition tests of these pests and an examination of the literature on them; methods of bulletin preparation.

3 2-hour laboratory periods, credit, 3.

Assistant Professor REGAN.

Prerequisite, Entomology 76.

78. **III. ADVANCED ENTOMOLOGY.** — Classification of insects and of their early stages; principles of classification, the use of literature on entomology and the preparation of bibliographies and indices; the enemies of insects.

1 class hour.

3 2-hour laboratory or field periods, credit, 4.

Professors FERNALD, CRAMPTON and REGAN.

Prerequisite, Entomology 77.

90. **II. EVOLUTION.**—For juniors; seniors may elect. In order to demonstrate the universal scope and operation of the laws of evolution, the course includes a brief sketch of the probable origin and evolution of matter as viewed in the light of modern physical and chemical research; the evolution of the solar system, leading to the formation of the earth; the changes in the earth, preparatory to the production of life; the physical and chemical basis of life; the probable steps in the formation of living matter, and the theories concerning it; the evolution of living things; the developmental history of man, and of the races of mankind, the evolution of human intelligence, languages, culture, institutions, etc., and man's probable future in the light of his past development. Especial consideration is given to the factors of evolution, the basic principles of heredity, sex-determination, variation and similar topics, with particular reference to their application to human welfare; and the recent contributions in the field of entomology to the advancement of our knowledge of these fundamental principles are briefly reviewed.

3 class hours.

Credit, 3.

Professor CRAMPTON.

Courses in Beekeeping.

65. **III. INTRODUCTORY BEEKEEPING.**—For juniors; seniors may elect. Designed to meet the demands of the horticulturist as well as of the prospective honey producer, and consists of a detailed study of the normal behavior of the honey bee and the colony as a whole, followed by an explanation and consideration of the various manipulations employed in the practical work of the apiary. In proportion to their relative importance, time is also given to the following topics: development and structure of the individual, sources of nectar, queen rearing, the prevention and control of bee diseases, and the marketing of honey. In so far as possible, the laboratory work parallels the lecture work, and is planned to familiarize the student with the most approved methods of beekeeping in the various branches of farming.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor PHILLIPS.

85. **I. ADVANCED BEEKEEPING.**—For seniors. Intended for those who expect to make beekeeping the principal part of their business, and is a continuation of Course 65, with a detailed consideration of the more important features of the industry, such as: wintering, spring management, swarm control and increase, and production and care of the crop. Other special topics considered are: commercial queen rearing, identification and treatment of the various bee diseases, the inside temperature of the hive, and beekeeping literature. The aim of the course is to fully equip the student for commercial beekeeping. The laboratory work takes up special manipulations, and attention is also given to the problems of beekeeping.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor PHILLIPS.

Mathematics and Civil Engineering.

Professor OSTRANDER, Professor MACHMER, Assistant Professor MOORE, Mr. PORTER.

The work of the freshman year is required. It is intended to furnish the necessary drill and groundwork needed for many of the scientific and practical courses of other departments. Thoroughness and accuracy are insisted upon.

The advanced work in mathematics is taught from a practical standpoint, and many of its applications to other subjects are given. The courses in surveying and civil engineering are given to furnish the groundwork for a professional career. Special emphasis is given to the subjects bearing on highway construction and maintenance.

For drawing, a room on the north side is used for the draughting. It has draughting tables, T squares, scales, etc., for twenty students. Vernier protractors, parallel rules and steel T squares are available for precise work. A small room is devoted to blue printing.

In surveying, the department has a considerable number of chains and tapes, two railroad compasses, a builder's level, two dumpy levels, two Y levels and two old levels used for teaching the adjustments. Six transits are available for student use. Two are provided with solar attachments. An omnimeter with vernier reading to ten seconds is available for geodetic work. A hand level, mining aneroid barometer, and prismatic compass are provided for reconnaissance work. A set of Gilmore's needles and a Fairbanks' machine are used for cement testing.

Required Courses.

1. **I. HIGHER ALGEBRA.** — Freshmen. A brief review of radicals, quadratic equations, ratio and proportion, and progressions; graphs, binomial theorem, undetermined coefficients, summation of series, variation, continued fractions, determinants, permutations and combinations, logarithms, theory of equations. Reitz and Crathorne's "College Algebra."

5 class hours.

Credit, 5.

The DEPARTMENT.

2. **II. HIGHER ALGEBRA.** — As stated under Course 1.

2 class hours.

Credit, 2.

The DEPARTMENT.

3. **III. SOLID GEOMETRY.** — Freshmen. Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Wentworth and Smith's "Solid Geometry." Required unless accepted for admission.

3 class hours.

Credit, 3.

The DEPARTMENT.

5. **II. PLANE TRIGONOMETRY.** — Freshmen. The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry."

3 class hours.

Credit, 3.

The DEPARTMENT.

6. **III. MENSURATION AND COMPUTATION.** — Freshmen. A review of methods of computation, with special emphasis on short and abbreviated processes, together with methods of checking computations and of forming close approximations; use of slide rule. Also the graph, mensuration of plane

and solid figures, weights and measures and elementary mechanism. Numerous practical problems are selected from such subjects as the following: the mathematics of woodworking; rough lumber; general construction; forestry methods in heights of trees; pulleys, belts and speeds; power and its transmission; dairying; agronomy; computation of areas from simple measurements. 2 class hours.

Credit, 2.

The DEPARTMENT.

Elective Courses.

26. **II. PLANE SURVEYING.** — For sophomores; juniors and seniors may elect. The elements of the subject, including the adjustment and use of the usual instruments. Textbook and lectures.

2 class hours.

Credit, 2.

The DEPARTMENT.

27. **III. PLANE SURVEYING.** — For sophomores; juniors and seniors may elect. As stated under Course 26. Includes field work.

3 2-hour laboratory periods, credit, 3.

The DEPARTMENT.

Prerequisite, Mathematics 26.

50. **I. ANALYTIC GEOMETRY.** — For juniors; seniors may elect. A discussion of the geometry of the line, the circle, conic sections, and the higher plane curves. Fine and Thompson's "Co-ordinate Geometry."

3 class hours.

Credit, 3.

The DEPARTMENT.

Prerequisites, Mathematics 1, 2, 3 and 5.

51. **II. DIFFERENTIAL AND INTEGRAL CALCULUS.** — For juniors; seniors may elect. A first course in the subject, with some of the more important applications. Granville's "Differential and Integral Calculus."

5 class hours.

Credit, 5.

The DEPARTMENT.

Prerequisites, Mathematics 1, 2, 3 and 5.

52. **III. INTEGRAL CALCULUS.** — For juniors; seniors may elect. A continuation of Course 51.

5 class hours.

Credit, 5.

The DEPARTMENT.

Prerequisite, Mathematics 51.

53. **II. ELEMENTARY STRUCTURES.** — For juniors; seniors may elect. An elementary course in roofs and bridges. Textbook and lectures.

3 class hours.

1 2-hour laboratory period, credit, 4.

The DEPARTMENT.

75. **I. HYDRAULICS AND SANITARY ENGINEERING.** — For seniors; juniors may elect. Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. Textbook and lectures.

5 class hours.

Credit, 5.

The DEPARTMENT.

76. **I. MATERIALS OF CONSTRUCTION, FOUNDATIONS AND MASONRY CONSTRUCTION.** — For seniors; juniors may elect. Textbook and lectures. 4 class hours. 1 2-hour laboratory period, credit, 5.
The DEPARTMENT.

77. **II. ROADS AND RAILROADS.** — For seniors; juniors may elect. Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. Textbook and lectures. 3 class hours. Credit, 3.
The DEPARTMENT.

78. **III. ROADS AND RAILROADS.** — For seniors; juniors may elect. As stated under Course 77. 3 2-hour laboratory periods, credit, 3.
The DEPARTMENT.

Prerequisite, Mathematics 77.

79. **I. APPLIED MECHANICS.** — Seniors. A course in applied mechanics, based on the calculus, with problems. Textbooks and lectures. 5 class hours. Credit, 5.
The DEPARTMENT.

Prerequisites, Mathematics 51, 52.

Microbiology.

Professor MARSHALL, Assistant Professor ITANO, Mr. AVERY, Miss GARVEY.

Three objectives are sought in the arrangement of the courses following: (1) Introductory courses (50 and 51) needed in the general training of every college student. (2) An introductory course followed by a specific course (as 80, 81, 82, 83), necessary to every student engaged in the Division of Agriculture, with which the specific course deals. (3) Introductory courses (50 and 51) followed by Courses 52, 75, 76 and 81, preparatory for students who are aiming to specialize in agricultural microbiology. (Courses 75, 76 and 81 are adapted to those having Courses 50 and 51 only, and are also adapted to those majoring in microbiology.)

The microbiological work is carried on in a building especially designed for it. There are 4 class laboratory rooms, 8 private laboratory rooms, 1 lecture room, 5 incubator rooms, 3 sterilizing rooms, 3 hood rooms, 3 washing rooms, 3 inoculating rooms, 3 weighing rooms, an animal room, a photographic and a dark room, a sub-basement refrigerator room, a library and 4 office rooms.

The class laboratory rooms are so arranged that individual desks are available for student use. Hot and cold water and gas connections are convenient for each desk; high-pressure steam and electric connections are also available. The building is well lighted and of sanitary construction; all the walls are of brick, and the building is fireproof.

The library is equipped with such books and current periodicals as are useful in the conduct of bacteriological work and investigations. Twenty-four scientific magazines are available regularly.

There are incubators, both electric and gas, hot-air sterilizers, ordinary steam sterilizers, autoclaves, an inspissator, blood-testing apparatus, vacuum apparatus, air-pressure apparatus, shaker, grinder, centrifugal machines, a

water still of 5 gallons per hour capacity, Hoskins' combustion furnace, a balopticon, complete microphotographic equipment, microscopes, microtome, and such other apparatus, glassware and chemicals as are needed for extensive and intensive work.

Elective Courses.

50. **I, II and III.** INTRODUCTORY AND GENERAL MICROBIOLOGY. — For juniors; seniors may elect. Aims to provide elementary basis for microbial studies and interpretation, to enable students to pursue special pertinent courses which will serve as supports in practical electives or majors, and to furnish students with such material as will be valuable in understanding public health problems. Three hours scheduled, five hours by arrangement. 2 class hours.

6 laboratory hours, credit, 5.

Professor MARSHALL and Mr. AVERY.

51. **II and III.** MORPHOLOGICAL, CULTURAL AND PHYSIOLOGICAL MICROBIOLOGY. — For juniors; seniors may elect. Types of micro-organisms, technic of handling, methods of culture and functions of micro-organisms are considered. This course is fundamental to all advanced and extended microbiological studies. One hour will be scheduled.

10 laboratory hours, credit, 5.

Mr. AVERY.

Prerequisite, Microbiology 50.

52. **III.** ADVANCED MORPHOLOGICAL, CULTURAL AND PHYSIOLOGICAL MICROBIOLOGY. — For juniors; seniors may elect. Prepares for a more intimate knowledge of microbiological agricultural problems. To accomplish this object it is necessary to provide more advanced technique and methods of culture, together with a more extensive knowledge of micro-organisms and their functions. One hour is scheduled.

10 laboratory hours, credit, 5.

Assistant Professor ITANO.

Prerequisite, Microbiology 50 and 51.

75. **II.** AGRICULTURAL MICROBIOLOGY. — For seniors; juniors may elect. This general comprehensive course is designed to cover in an elementary manner those subjects only which confront the student of general agriculture, — the microbiological features of air, water, sewage, soil, dairy, fermentations, food, vaccines, antisera, microbial plant infections, methods and channels of infections, immunity and susceptibility, microbial infections of man and animals, methods of control or sanitary and hygienic practices. One hour is scheduled.

10 laboratory hours, credit, 5.

Professors MARSHALL and ITANO, and Mr. AVERY.

Prerequisite, Microbiology 50 and 51.

76. **III.** AGRICULTURAL MICROBIOLOGY. — For seniors; juniors may elect. As stated under Course 75. One hour will be scheduled.

10 laboratory hours, credit, 5.

Professors MARSHALL and ITANO, and Mr. AVERY.

Prerequisites, Microbiology 50 and 75.

80. **II. SOIL MICROBIOLOGY.** — For seniors; juniors may elect. Such subjects as the number and development of micro-organisms in different soils; the factors which influence their growth, food, reaction, temperature, moisture and aeration; the changes wrought upon inorganic and organic matter in the production of soil fertility, ammonification, nitrification and denitrification; fixation of nitrogen symbiotically and non-symbiotically; methods of soil inoculation receive attention. One hour is scheduled.

10 laboratory hours, credit, 5.

Assistant Professor ITANO.

Prerequisite, Microbiology 50 and 51.

81. **I. HYGIENIC MICROBIOLOGY.** — For seniors; juniors may elect. An attempt will be made to select certain material which is basic to public hygiene and sanitation, as applied to man and animals. The microbiology of water supplies, food supplies, vaccines, antisera or antitoxins; the channels by which micro-organisms enter the body, the influence of body fluids and tissues upon them, body reactions with micro-organisms (susceptibility and immunity); the micro-organisms of some of the most important infectious diseases, methods of control, including disinfectants and disinfection, antiseptics, antisepsis and asepsis, will be treated. One hour is scheduled.

10 laboratory hours, credit, 5.

Assistant Professor ITANO.

Prerequisite, Microbiology 50 and 51.

82. **I. DAIRY MICROBIOLOGY.** — For seniors; juniors may elect. Special emphasis is placed upon milk supplies. The microbial content of milk, its source, its significance, its control; microbial taints and changes in milk; groups or types of organisms found in milk; milk as a carrier of disease-producing organisms; the value of straining, aeration, clarification, centrifugal separation, temperature, pasteurization; the abnormal fermentations of milk; bacteriological milk standards and their interpretation; ripening of milk and cream; the bacterial content of butter; a passing survey of the microbiology of cheeses; a study of special dairy products, as ice cream, condensed milk, artificial milk drinks (the products of microbial actions), represents a list of topics considered.

10 laboratory hours, credit, 5.

Professor MARSHALL and Miss GARVEY.

Prerequisite, Microbiology 50 and 51.

83. **I. FOOD MICROBIOLOGY.** — For seniors; juniors may elect. A study of the principles of food preservation, and food preservation by means of drying, canning, refrigerating and addition of chemicals, will be pursued. Food fermentations, as illustrated by bread, pickles, sauerkraut, ensilage, vinegar, wine, etc., will be examined. Decomposition of foods, as may be seen in meat, oysters, fish, milk, etc., as well as diseased and poisonous foods, will receive consideration. Contamination of food supplies by means of water, sewage, handling, exposure, diseased persons, etc., is of especial significance, and will be demonstrated by laboratory exercises. Laboratory inspection of foods is now a subject of great import and is given attention. One hour is scheduled.

10 laboratory hours, credit, 5.

Professor MARSHALL and Miss GARVEY.

Prerequisite, Microbiology 50 and 51.

SPECIAL COURSES FOR WOMEN.

1. **I. ELEMENTARY MICROBIOLOGY.** — For freshmen. Devoted to the various types of micro-organisms, their distribution in nature and their characterization. Such methods as are essential for examination, manipulation and culturing are studied and employed.

6 laboratory periods, credit, 3.
Mr. AVERY.

In place of Military 1, tactics; Military 4, drill; fall term, freshmen.

3. **III. ELEMENTARY MICROBIOLOGY.** — For freshmen. Continuation of 1.

4 laboratory periods, credit, 2.
Mr. AVERY.

In place of Military 3, tactics; Military 6, drill; spring term, freshmen.

25. **I. PERSONAL HYGIENE.** — For sophomores. Such subjects as the hygiene of the mouth and teeth, the gastro-intestinal tract, food, the skin, respiration apparatus, ear, eye and nervous system are reviewed. The value of bathing, clothing, physical exercise, etc., are considered. Attention is given to emergencies, accidents of "first aid," and such other matters as usually fall within this category.

2 class hours, credit, 2.
Professor MARSHALL and Miss GARVEY.

In place of Military 25, tactics; Military 28, drill; fall term, sophomores.

27. **III. SANITARY SCIENCE.** — For sophomores. The usual topics of sanitary science, as ventilation, heating, plumbing, water supply, sewage disposal, food control and communicable diseases, are treated from the standpoint of individual and public health control.

2 class hours, credit, 2.
Professor MARSHALL and Miss GARVEY.

In place of Military 27; Military 30; spring term, sophomores.

Physics.

Professor HASBROUCK, Professor HARRINGTON, Mr. ALDERMAN.

The fundamental and basic importance of the laws and phenomena of physics makes necessary no explanation of the introduction of this subject into the curriculum of an agricultural college. The logical development of the subject emphasizes the importance of physics as a science in itself. Special emphasis is laid, however, on the correlation of the principles studied with the sciences of agriculture, botany, chemistry and zoölogy, thus furnishing an extra tool by use of which the student's work in all the subjects may be more effective.

In Courses 25, 26 and 27 the subject-matter is presented with the idea of its special application primarily in the work in agriculture and general science. The full year's work is advised for all students continuing work specifically in the Division of Science. Courses 25 and 26 are required of all students. The subject-matter is especially selected and arranged for its practical application rather than its theoretical development. Courses 60, 51 and 52 are advised for students in chemistry, general biology, microbiology and general science. The subject-matter is selected, and the courses developed, with the idea of making the student proficient in laboratory manipulation. Sufficient theory is given in connection with the work to enable the student to apply the knowledge and practice thus gained in the departments indicated above.

The department has at its command a building on the east campus, containing a general lecture room and laboratory for sophomore work, a laboratory for junior work, and in the basement one small laboratory for quantitative work in light measurement. There is also in the basement a fairly well-equipped shop for the repair and construction of apparatus used in the department work. The usual apparatus for the demonstration in the lecture room is in the possession of the department. The laboratory equipment is such as to enable the department to offer qualitative work in mechanics, heat, electricity and light.

Required Courses.

25. **I. GENERAL PHYSICS.** — Sophomores. Mechanics of solids and fluids. This course includes statics, with equilibrium of rigid bodies, work, energy and friction; kinetics, considering rectilinear motion and motion in a curved path; harmonic motion; rotation of rigid bodies, including kinematics of rotation; liquids and gases, with properties of fluids at rest and in motion; properties of matter and its internal forces, including elasticity, capillarity, surface tension.

3 class hours.

1 2-hour laboratory period, credit, 4.

Professors HASBROUCK and HARRINGTON and Mr. ALDERMAN.

26. **II. ELECTRICITY AND MAGNETISM.** — Sophomores. Includes such subject-matter as magnetism, electrostatics, electric currents with their production, chemical, heating and mechanical effects; battery cells, measurement of voltage, current flow and resistance, motors and generators.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor HARRINGTON and Mr. ALDERMAN.

Elective Courses.

27. **III. HEAT AND LIGHT.** — For sophomores; juniors and seniors may elect. Thermometry, expansion, colorimetry and specific heat, transmission of heat, changes of state, radiation and absorption. Wave theory of light, optical instruments, analysis of light, color, interference, diffraction, polarization.

4 class hours.

1 2-hour laboratory period, credit, 5.

Professors HASBROUCK and HARRINGTON and Mr. ALDERMAN.

50. **I. ELECTRICITY, HEAT AND LIGHT.** — For juniors; seniors may elect.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor HARRINGTON.

Prerequisite, Physics 27.

51. **II.** ELECTRICITY, HEAT AND LIGHT. — For juniors; seniors may elect. Continuation of Course 50.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor HARRINGTON.

Prerequisite, Physics 50.

52. **III.** ELECTRICITY, HEAT AND LIGHT. — For juniors; seniors may elect. Continuation of Courses 50 and 51.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor HARRINGTON.

Prerequisite, Physics 51.

75. **I.** 76. **II.** 77. **III.** LIGHT. — For seniors and graduate students. Formation of optical images, photography, optical instruments, interference, diffraction, spectroscopy, optical phenomena of the atmosphere, polarization and double refraction, magneto optics and electro optics, radiation.

3 class hours.

Credit, 3.

The DEPARTMENT.

Prerequisites, Physics 50, 51 and 52; Mathematics 50, 51 and 52.

Veterinary Science.

Professor PAIGE, Professor GAGE.

The courses in veterinary science have been arranged to meet the needs (1) of students who propose following practical agriculture; (2) of prospective students of human and veterinary medicine; and (3) of teachers and laboratory workers in the biological sciences.

The department occupies a modern laboratory and hospital stable, built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There is a lecture hall, a museum, a demonstration room, a photographing room and a workshop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in every department of veterinary science, including pathology, serology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

Elective Courses.

50. **I. VETERINARY HYGIENE AND STABLE SANITATION.** — For juniors; seniors may elect. Familiarizes students with the relation of water, food, air, light, ventilation, care of stables, disposal of excrement, individual hygiene, etc., to the prevention of disease in farm animals.

5 class hours.

Credit, 5.

Professor PAIGE.

51. **I. COMPARATIVE (VETERINARY) ANATOMY.** — For seniors; juniors may elect. The anatomy of the horse is studied in detail, and that of other farm animals compared with it where differences exist. This course is essential for those students wishing to elect Course 76.

5 class hours.

Credit, 5.

Professor PAIGE.

75. **II. GENERAL VETERINARY PATHOLOGY. MATERIA MEDICA AND THERAPEUTICS.** — For juniors; seniors may elect. Such fundamental and general pathological conditions are studied as inflammation, fever, hypertrophy, atrophy, etc., a knowledge of which is essential in the diagnosis, prevention and treatment of disease. The course in pathology is followed by one in materia medica and therapeutics, dealing with the origin, preparation, pharmacology, pharmacy, administration and therapeutic use of the more common drugs. Poisonous plants and symptoms and treatment of plant poisoning are also considered.

5 class hours.

Credit, 5.

Professor PAIGE.

76. **II. THEORY AND PRACTICE OF VETERINARY MEDICINE; GENERAL, SPECIAL AND OPERATIVE SURGERY.** — For seniors; juniors may elect. Familiarizes students with the various medical and surgical diseases of the different species of farm animals. Particular attention is given to diagnosis and first-aid treatment. The technique of simple surgical operations that can with safety be performed by the stock owner. Lectures, demonstrations and practice. This course should be taken in conjunction with Course 51.

5 class hours.

Credit, 5.

Professor PAIGE.

Prerequisite, Veterinary 75.

78. **I. ESSENTIALS OF GENERAL PATHOLOGY.** — For seniors; juniors may elect. Introduces students to some of the essential anatomical, histological and general physiological phenomena essential to the understanding of some of the simple general pathological conditions found in domestic animals. Some of the common methods of diagnosis are considered in the laboratory. The various chemical and biological reactions and tests are presented from the standpoint of pure science, showing applications of chemistry and biology. The course serves to educate liberally and stimulate in the student of agriculture the appreciation of some of the methods used in animal pathology for detecting and controlling some of the more common animal diseases. Lectures, demonstration and laboratory work.

2 3-hour laboratory periods, credit, 3.

Professor GAGE.

79. II. ESSENTIALS OF GENERAL ANIMAL PATHOLOGY.—For seniors; juniors may elect. A continuation of Course 78, devoted to a study of some of the common pathological conditions by means of prepared sections, the aim being to demonstrate to the student abnormal animal histological structures commonly observed when material from various cases of animal diseases is prepared for microscopical study. Some of the biological products used in protecting animals against disease are considered.

2 3-hour laboratory periods, credit, 3.
Professor GAGE.

Prerequisite, Veterinary 78.

80. III. ESSENTIALS OF GENERAL ANIMAL PATHOLOGY.—For seniors; juniors may elect. As stated in Courses 78 and 79.

2 3-hour laboratory periods, credit, 3.
Professor GAGE.

Prerequisite, Veterinary 79.

85. I. AVIAN PATHOLOGY.—For seniors; juniors may elect. A course in poultry diseases. The object is to present information concerning the common diseases of poultry, their etiology, diagnosis and prevention. Consists of a systematic study of the diseases of the alimentary tract, liver and abdominal region, followed by a study of the diseases of the respiratory system, circulation and kidneys. The important disease-producing external and internal parasites are considered; also diseases of the skin and reproductive organs. Lectures and demonstrations.

2 3-hour laboratory periods, credit, 3.
Professor GAGE.

86. II. AVIAN PATHOLOGY.—For seniors; juniors may elect. As stated under Course 85, also devoted to the study of some of the special diseases of poultry. Recent methods used in the control of these diseases are considered and opportunity offered the student for demonstrating various disease processes by means of prepared slides. Lectures, demonstrations and laboratory work.

2 3-hour laboratory periods, credit, 3.
Professor GAGE.

Prerequisite, Veterinary 85.

87. III. AVIAN PATHOLOGY.—For seniors; juniors may elect. As stated under Courses 85 and 86.

2 3-hour laboratory periods, credit, 3.
Professor GAGE.

Prerequisite, Veterinary 86.

Zoölogy and Geology.

Professor GORDON, Dr. ABBOTT.

The facts and principles of the sciences of zoölogy and geology have important applications in industry and the arts, and with those of their sister sciences form a body of knowledge of value and interest with which the educated man finds it necessary to gain a close familiarity. The elective courses in this depart-

ment stand as offerings to students who wish to supplement their work in other departments, or who, for any reason, wish to enlarge their knowledge in either zoölogy or geology. Students are encouraged to consult the department about any courses which may be available to them, and which might prove necessary or helpful for any line of work they may wish to follow.

The building occupied jointly by the department of entomology and the department of zoölogy and geology has for the work in zoölogy and geology laboratories equipped with gas, compound microscopes and the accessories needed for study, research and demonstration in these subjects. There are two lecture rooms used jointly by the two departments. The Zoölogical Museum has a representative collection of several thousand specimens of animals, and is drawn upon for material illustrating the various courses.

ZOÖLOGY.

Required Course.

25. **I. GENERAL PRINCIPLES AND TEACHINGS OF ZOÖLOGY.** — Sophomores. An introductory course in which some of the basic features of animal structure, functions of organs and relations of animals to each other are emphasized. In the laboratory work an attempt is made to give first-hand knowledge of animals as a means to a better understanding of some modern conceptions that have grown out of zoölogical science, and with which the lectures deal.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Professor GORDON and Dr. ABBOTT.

Elective Courses.

27. **III. ELEMENTS OF MAMMALIAN ANATOMY.** — Sophomores; juniors and seniors may elect. An introductory course which aims to acquaint the student with the positions, relations, names and functions of the principal organs and systems of organs of the mammalian body.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor GORDON or Dr. ABBOTT.

Prerequisite, Zoölogy 25.

50. **I. SYNOPSIS INVERTEBRATE ZOÖLOGY.** — Juniors; seniors may elect. A course in which the student examines and compares representatives of the various phyla, classes and orders of the non-vertebrate animals.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Dr. ABBOTT.

Prerequisite, Zoölogy 25.

51. **II. SYNOPSIS INVERTEBRATE ZOÖLOGY.** — Juniors; seniors may elect. Continuation of Course 50.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Dr. ABBOTT.

Prerequisite, Zoölogy 50.

52. **III. SYNOPSIS INVERTEBRATE ZOÖLOGY.** — Juniors; seniors may elect. Continuation of Course 51.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Dr. ABBOTT.

Prerequisite, Zoölogy 51.

53. **I. ELEMENTS OF MICROSCOPIC TECHNIQUE.** — Juniors; seniors may elect. The student is taught the usual methods of preparing material for microscopic examination, including embedding in paraffin and celloidin, sectioning, and differentiation by stains.

2 2-hour laboratory periods, credit, 3.
Professor GORDON.

54. **II. HISTOLOGY.** — Juniors; seniors may elect. A microscopic study of selected normal animal tissues in connection with their physiological properties.

1 class hour.

2 2-hour laboratory periods, credit, 3.
Dr. ABBOTT.

75. **I. SPECIAL ZOÖLOGY.** — Juniors, seniors and graduates may apply for such special work as they are qualified to undertake.

1 class hour.

2 2-hour laboratory periods, credit, 3.
The DEPARTMENT.

76. **II. SPECIAL ZOÖLOGY.** — Same as Course 75.

1 class hour.

2 2-hour laboratory periods, credit, 3.
The DEPARTMENT.

77. **III. SPECIAL ZOÖLOGY.** — Same as Course 75.

1 class hour.

2 2-hour laboratory periods, credit, 3.
The DEPARTMENT.

79. **III. ORNITHOLOGY.** — A study of the taxonomic characters, distribution and habits of birds.

1 class hour.

2 2-hour laboratory periods, credit, 3.
The DEPARTMENT.

Geology.

2. **II. AGRICULTURAL GEOLOGY.** — Freshmen. An elementary course dealing with the geology of soils, fertilizers, underground water, etc.

2 class hours.

Credit, 2.
Professor GORDON.

27. **III. GENERAL GEOLOGY.** — Sophomores; juniors and seniors may elect. A course in the physical aspects of geology, dealing with the origin, arrangement and manifold changes of the materials composing the earth's crust. Excursions by arrangement.

3 class hours.

2 2-hour laboratory periods, credit, 5.
Professor GORDON.

DIVISION OF THE HUMANITIES.

Professor —.

Economics and Sociology.

Professor —.

Courses in 1921-22, given by Assistant Professor Parker, Acting Head of the Department, assisted by Professor Crook of Amherst College, and Professor Sims.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

The courses in economics and sociology are planned with the purpose of giving the student that knowledge and understanding of the important factors and problems in this field of study and life which every active citizen and educated man ought to have.

Elective Courses.

26. II. CIVILIZATIONS, ANCIENT AND MODERN. — For sophomores; others may elect. The evolutionary origin and history of man; characteristics of primitive man, departure from the animal status and beginnings of civilization; origin and development of industries, arts and sciences; the evolution of languages, warfare, migrations and social institutions; a study of the powerful natural and human forces that have brought man from the early stages to modern development; characteristic features of the leading civilizations and races of ancient and modern times; beneficial and dangerous factors in American life in view of the history of human civilization.

5 class hours.

Credit, 5.

Assistant Professor PARKER.

50. II. BUSINESS AND INDUSTRY. — For juniors and seniors. The forms, organization, administration and labor problems of business. Methods of organizing, financing and administering corporations and partnerships; forms of business administration, wholesaling, jobbing, retailing, advertising, credits and collections; systems of industrial remuneration for wage earners, co-operation and preserving industrial peace; problems concerned with protective legislation for workmen and employers, sweated industries, prison labor, child labor and industrial education.

5 class hours.

Credit, 5.

Assistant Professor PARKER.

51. I. INTRODUCTION TO ECONOMIC PRINCIPLES AND PROBLEMS. — For juniors. Definitions of economic terms, such as wealth, capital, value, etc.; factors of production, exchange and consumption; principles of economic production, supply and demand, diminishing returns, division of labor, productive organization, concentration of capital and labor, trust and monopoly problems, public control of production and distribution; principles of exchange, theories of value, money and its problems; international trade, tariff and free trade theories, American merchant marine, reciprocity, and trade treaties; forms of income, wages, interest, rent, profits and the forces which

govern them; principles of spending, economy, luxury, conservation of individual and national resources; principles and agencies for saving, investments, banks, building associations, insurance of all kinds; schemes for social organization; socialism, communism, industrial democracy. Textbook and readings.

5 class hours.

Credit, 5.

Professor CROOK.

75. I. SOCIAL INSTITUTIONS AND SOCIAL REFORMS. — For seniors; juniors by permission. Social institutions, such as the family, the State, property, religions; and such current problems as eugenics, race suicide, divorce, crime and delinquent classes, prison reform, prevention and treatment of dependents and defectives, poverty, its causes and preventions; constructive modern social reform movements for insurance of wage earners, protection of childhood, assurance of safety, health and play time for all classes. The correctional and charitable institutions of Massachusetts are studied in considerable detail.

5 class hours.

Credit, 5.

Professor SIMS.

77. III. PUBLIC FINANCE, TAXATION, MONEY AND BANKING. — For seniors. Systems and problems of taxation as they are found in Europe and America; objects for spending public revenue; public debts and methods of organizing them; systems of money and currency problems of America; types, methods and functions of banks; economic and financial crises and depressions in the United States; modern war finance. Readings and lectures.

5 class hours.

Credit, 5.

Assistant Professor PARKER.

History and Government.

Elective Courses.

50. III. GOVERNMENT. — For juniors; seniors may elect. Forms and working methods of the governments of Great Britain, Germany, France, Russia, Switzerland, New Zealand and Canada; historic types and theories of government; forms and methods of Federal, State and local governments in America; progress and problems of democracy and new reform movements in organization and administration; new tendencies towards social legislation and extension of governmental control.

5 class hours.

Credit, 5.

Assistant Professor PARKER.

54. I. MODERN EUROPEAN HISTORY. — Juniors; seniors may elect. The modern history of the principal countries of Europe, especially the great movements and revolutions that developed the nations up to the present generation.

3 class hours.

Credit, 3.

Assistant Professor PARKER.

79. II. EUROPEAN HISTORY SINCE 1870. — For seniors; juniors may elect. The Franco-Prussian War and the formation of the German Empire, the unification of Italy, the Third French Republic, European Expansion in

the East, the Russo-Japanese War, and the origin, events and probable results of the War of 1914. While a continuation of Course 54, this course will be complete in itself, and may be elected by those who have had no history training. Its aim is to provide the basis for an understanding of present-day conditions, and for an intelligent participation in world affairs.

3 class hours.

Credit, 3.

Assistant Professor PARKER.

Languages and Literature.

Professor LEWIS, Professor PATTERSON, Professor MACKIMMIE, Professor ASHLEY, Assistant Professor PRINCE, Assistant Professor JULIAN, Assistant Professor RAND, Miss GOESSMANN, Mr. THISSELL, Mr. BÖGHOLT.

ENGLISH.

Required Courses.

1. **I.** 2. **II.** 3. **III.** ENGLISH. — Freshmen. Composition. Intended to teach straight thinking, sound structure, clear and correct expression. Lectures, recitations, theme writing and conferences.

3 class hours each term.

Credit, 3 each term.

Professors PATTERSON, PRINCE and RAND.

25. **I.** 26. **II.** 27. **III.** ENGLISH. — Sophomores. A general reading course in English literature.

2 class hours each term.

Credit, 2 each term.

Professor LEWIS and Miss GOESSMANN.

Elective Courses in English Language and Literature.

50. **I.** ENGLISH POETRY OF THE ROMANTIC PERIOD (1921-22). — Alternates with course 53. For juniors; seniors may elect. A course in history, appreciation and understanding. Some of the writers studied are Gray, Goldsmith, Burns, Scott, Wordsworth, Coleridge, Byron, Keats and Shelley.

3 class hours.

Credit, 3.

Professor PATTERSON.

51. **II.** ENGLISH POETRY IN THE NINETEENTH CENTURY. — Alternates with Course 54. For juniors; seniors may elect. In general, this course is like Course 50. Tennyson, Browning, Mrs. Browning, Arnold, Clough, the Rossettis, Morris, Swinburne and others.

3 class hours.

Credit, 3.

Professor LEWIS.

57. **III.** ENGLISH POETRY IN THE NINETEENTH CENTURY. — Alternates with Course 58. For juniors; seniors may elect. As stated under Course 51.

3 class hours.

Credit, 3.

Professor LEWIS.

52. **III.** ENGLISH WRITERS FROM MILTON TO POPE. — For juniors; seniors may elect. A survey course that emphasizes the leading writers, literary currents and the thought of the period. Some of the writers studied are Milton, Dryden, Addison, Swift and Pope.

3 class hours.

Credit, 3.

Professor PATTERSON.

53. **I. ENGLISH PROSE OF THE ROMANTIC PERIOD.** — For juniors; seniors may elect. A course in English prose paralleling Course 51. Some of the writers studied are Goldsmith, Coleridge, Lamb, DeQuincey and Hazlitt.
3 class hours.

Credit, 3.

Professor PATTERSON.

54. **II. ENGLISH PROSE IN THE NINETEENTH CENTURY (1921-22).** — For juniors; seniors may elect. Parallels Course 51. Among the writers considered will be Macaulay, Carlyle, Ruskin, Newman and Arnold.
3 class hours.

Credit, 3.

Professor LEWIS.

58. **III. ENGLISH PROSE IN THE NINETEENTH CENTURY (1921-22).** — For juniors; seniors may elect. As stated under Course 54.
3 class hours.

Credit, 3.

Professor LEWIS.

55. **II. AMERICAN LITERATURE.** — For juniors; seniors may elect. A general survey of literature in America, especially in the nineteenth century, with an introduction to the work of the best known writers, and with especial attention to the relations between national life and history and national thought as expressed in literature. The usual authors — Irving, Cooper, Bryant, Poe, Longfellow, Emerson, Hawthorne, Whittier, Parkman, Lowell, Holmes, Whitman, Lanier — are discussed.
3 class hours.

Credit, 3.

Assistant Professor PRINCE.

56. **III. AMERICAN LITERATURE.** — For juniors; seniors may elect. As stated under Course 55.
3 class hours.

Credit, 3.

Assistant Professor PRINCE.

Prerequisite, English 55.

60. **I. THE LITERATURE OF RURAL LIFE.** — For juniors; seniors may elect. A critical and appreciative study of writers, both in prose and poetry, who have interpreted nature from the viewpoint of the lover of country life, and those who have idealized agriculture, horticulture and other rural pursuits, together with those who have upheld as an ideal the development of a rural environment in cities.
3 class hours.

Credit, 3

Miss GOESSMANN.

61. **II. THE LITERATURE OF RURAL LIFE.** — For juniors; seniors may elect. As stated under Course 60.
3 class hours.

Credit, 3.

Miss GOESSMANN.

Prerequisite, English 60.

75. **III. PROSE FICTION.** — The short story or the novel. For seniors; juniors may elect. Readings, reports and discussions.
3 class hours or library equivalents. Credit, 3.

79. **II. THE DRAMA.** — For seniors; juniors may elect. A cursory survey of early English drama, its origin, forms and meaning, will be followed by a careful study of Shakespeare. Two of his plays are analyzed in detail, and many others read and discussed.
3 class hours. Credit, 3.

Assistant Professor RAND.

80. **III. THE DRAMA.** — For seniors; juniors may elect. Traces the development of modern drama, especial attention being given to plays by Congreve, Goldsmith, Sheridan, Robertson, Jones, Pinero, Fitch, Shaw, Moody and Ibsen.
3 class hours. Credit, 3.

Assistant Professor RAND.

APPLIED ENGLISH — RURAL JOURNALISM.

The courses in rural journalism have two chief aims: first, to turn the student's attention toward matters of contemporary concern; second, to provide training for students who may wish to enter journalism (especially agricultural or industrial journalism or non-urban newspaper work), or who are preparing for the numerous other vocations in which acquaintance with newspaper practices and requirements is of value. All of the courses afford constant practice in writing. So far as conditions permit, instruction is largely individual.

50. **I. ADVANCED COMPOSITION.** — For juniors; seniors may elect. Advanced work in expository writing based upon specimens by contemporary authors and upon the personal experience of the student. Particular attention is given to organization, diction and style.

Credit, 3.
Assistant Professor RAND.

51. **II. ADVANCED COMPOSITION.** — For juniors; seniors may elect. Work in journalistic and fictional narrative with supplementary reading.

Credit, 3.
Assistant Professor RAND.

52. **III. ADVANCED COMPOSITION.** — For juniors; seniors may elect. The preparation of theses and similar manuscripts along such lines as the students may desire. Clearness and readability are the ends to be attained.

Credit, 3.
Assistant Professor RAND.

53. **I. 54. II. 55. III. NEWS-GATHERING AND NEWS-WRITING.** — For juniors; seniors may elect. The foundation aims and conceptions of journalism; reporting. Courses 53, 54 and 55 are suited to students whose vocation may require the popular presentation of technical or other informa-

tion; *e.g.*, extension workers, county agents, agricultural-school instructors, experiment-station editors, survey and other social-service workers, men engaged in sociological or economic investigations, landscape architects and civil and sanitary engineers.

6 laboratory hours or class equivalents, credit, 3.

77. **I.** 78. **II.** 79. **III.** EDITORIAL MATERIALS AND METHODS. — For seniors; juniors may elect. Readings, quizzes, reports and personal conferences; reading of daily papers and weekly reviews or rural-life periodicals; writing of editorial articles. Recommended to students who desire practice in discovering the significant aspects of matters of public attention and in effectively expressing comment thereon.

6 laboratory hours or class equivalents, credit, 3.

80. **I.** 81. **II.** 82. **III.** ADVANCED JOURNALISTIC PRACTICE. — Seniors. Preparation, editing and publication in a newspaper of a rural-life page.

8 or 10 laboratory hours, credits, 4 or 5.

PUBLIC SPEAKING.

Required Course.

1. **I, II and III.** PUBLIC SPEAKING. — Freshmen. Public speaking is required in the first, second or third term, at the option of the instructor. The course is concerned with the actual problems which confront the man who would speak convincingly and persuasively. Much attention, therefore, is given to the preparation and delivery of extempore speeches.

1 class hour.

Credit, 1.

Professors PATTERSON, PRINCE and RAND.

Elective Courses.

50. **I.** ARGUMENTATION. — For juniors; seniors may elect. Presents the fundamental principles of argumentation as applied to oral and written discourse, and develops in the student power to handle argument convincingly and persuasively. Lectures, discussions of leading questions of the day, practice in brief-drawing and the writing of forensics. The course is recommended for those who desire to enter the intercollegiate debates.

3 class hours.

Credit, 3.

Assistant Professor PRINCE

Prerequisites, Public Speaking 1, 2 or 3.

51. **II.** OCCASIONAL ORATORY. — For juniors; seniors may elect. A study of the elements of vocal expression and action; speeches on assigned subjects; prescribed reading; the preparation and delivery of several formal orations. Textbook, Shurter's "The Rhetoric of Oratory." The course is recommended for those who wish to enter the Flint contest.

3 class hours.

Credit, 3.

Assistant Professor PRINCE.

Prerequisites, Public Speaking 1, 2 or 3.

French and Spanish.

PROFESSOR MACKIMMIE, MR. THISSELL.

The aim of the courses in French and Spanish is to give the student a practical knowledge of these languages for the purpose of wider reading and research, to introduce him to some of their treasures in art and science, and through the literature to acquaint him with the people. In the elementary courses as much time as possible is given to oral work, to develop a speaking, as well as a reading, knowledge of the tongue.

FRENCH.*Required Courses.*

1. **I. 2. II. 3. III.** **ELEMENTARY FRENCH.** — Freshmen; open upon arrangement to other students. The essentials of grammar are rapidly taught and will be accompanied by as much reading as possible. Required of freshmen presenting German for entrance who do not continue that language and have not studied French.

3 class hours each term.

Credit, 3 each term.

4. **I. 5. II. 6. III.** **INTERMEDIATE FRENCH.** — Freshmen; open upon arrangement to other students. Training for rapid reading. The reading of a number of short stories, novels and plays; composition, reports on collateral reading from periodicals and scientific texts in the library.

3 class hours each term.

Credit, 3 each term.

Professor MACKIMMIE.

Prerequisite, required of freshmen who present two years of French for entrance and do not take German.

Elective Courses.

25. **I.** **INTERMEDIATE FRENCH.** — For sophomores; open upon arrangement to other students. Training for rapid reading; the reading of a number of short stories, novels and plays; readings from periodicals and scientific texts in the library.

3 class hours.

Credit, 3.

Professor MACKIMMIE.

Prerequisites, French 1, 2 and 3.

26. **II.** **INTERMEDIATE FRENCH.** — For sophomores; open upon arrangement to other students. As stated under Course 25.

3 class hours.

Credit, 3.

Professor MACKIMMIE.

Prerequisite, French 25.

27. **III.** **INTERMEDIATE FRENCH.** — For sophomores; open upon arrangement to other students. As stated under Course 25.

3 class hours.

Credit, 3.

Professor MACKIMMIE.

Prerequisite, French 26.

28. **I. ADVANCED FRENCH.** — For sophomores; open upon arrangement to other students. A reading course. Balzac's "Eugénie Grandet" and "Le Père Goriot," and other masterpieces of the nineteenth century; Brunetière's "Honoré de Balzac" and Harper's "Masters of French Literature;" readings in the library and written reports.

3 class hours.

Credit, 3.

Prerequisites, French 4, 5 and 6.

29. **II. ADVANCED FRENCH.** — For sophomores; open upon arrangement to other students. As stated under Course 28.

3 class hours.

Credit, 3.

Prerequisites, French 4, 5 and 6.

30. **III. ADVANCED FRENCH.** — For sophomores; open upon arrangement to other students. General view of the history of French literature; Kastner and Atkins' "History of French Literature." Representative works of the important periods. Outside reading.

3 class hours.

Credit, 3.

Prerequisites, French 25 and 26, or French 28 and 29.

50. **I. SCIENTIFIC FRENCH.** — For juniors; seniors may elect. Meets the requirements of individual students and equips them with exact English equivalents for the French scientific terms in their particular science. Word lists of scientific terms are required, and also weekly readings and reports from scientific works in the subject in which they are majoring. Several scientific works are read.

3 class hours.

Credit, 3.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

51. **II. SCIENTIFIC FRENCH.** — For juniors; seniors may elect. As stated under Course 50.

3 class hours.

Credit, 3.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

52. **III. SCIENTIFIC FRENCH.** — For juniors; seniors may elect. As stated under Course 50.

3 class hours.

Credit, 3.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

75. **I. FRENCH LITERATURE.** — For seniors; juniors may elect. The object of Courses 75, 76 and 77 is to give an introduction to recent movements in French literature. Course 75 deals with the drama, and plays by Augier, A. Dumas *filis*, Delavigne and other contemporary dramatists.

2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

76. **II. FRENCH LITERATURE.** — For seniors; juniors may elect. The novel. Works by Flaubert, the De Goncourts and Zola are read. Written reports are required on outside reading.
2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

77. **III. FRENCH LITERATURE.** — For seniors; juniors may elect. Modern criticism. Sainte-Beuve, "Causeries du Lundi" (Harper) and works by Taine and Renan. Reference book, Lanson's "Histoire de la Littérature Française."
2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

SPANISH.

Elective Courses.

50. **I. ELEMENTARY SPANISH.** — For juniors; seniors may elect. Open to other students upon arrangement. Grammar, with special drill in pronunciation; exercises in conversation and composition. Reading from a reader and selected short stories.
3 class hours.

Credit, 3.

Professor MACKIMMIE.

51. **II. ELEMENTARY SPANISH.** — For juniors; open to other students upon arrangement. As stated in Course 50.
3 class hours.

Credit, 3.

Professor MACKIMMIE.

Prerequisite, Spanish 50.

52. **III. ELEMENTARY SPANISH.** — For juniors; open to other students upon arrangement. As stated in Course 50.
3 class hours.

Credit, 3.

Professor MACKIMMIE.

Prerequisite, Spanish 51.

75. **I. MODERN SPANISH AUTHORS.** — Seniors. Reading from modern Spanish novel and drama. Translation of English into Spanish. Private reading.
2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisite, Spanish 52.

76. **II. MODERN SPANISH AUTHORS.** — Seniors. As stated in Course 75.
2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisite, Spanish 75.

77. **III. MODERN SPANISH AUTHORS.** — Seniors. As stated in Course 75.
2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisite, Spanish 76.

German and Music.

Professor ASHLEY, Assistant Professor JULIAN.

GERMAN.

The courses in German are intended to give the student a reading knowledge of the language and to introduce to him some of the masterpieces of German literature. To the student interested in pursuing advanced reading in scientific German, opportunity is given to do corollary reading in his major subject, in collaboration with the head of that department.

Required Courses.

1. **I. 2. II. 3. III.** **ELEMENTARY GERMAN.** — Freshmen; open upon arrangement to other students. Grammar, composition and reading. Especial attention is given to oral work in German and to translation of English into German. Required of those presenting French for entrance who do not continue that language and have not studied German.

3 class hours each term.

Credit, 3 each term.

Professors ASHLEY and JULIAN.

4. **I. 5. II. 6. III.** **INTERMEDIATE GERMAN.** — Freshmen; open upon arrangement to other students. Selected works of Schiller, Heine and Goethe. Grammar review and advanced prose composition.

3 class hours each term.

Credit, 3 each term.

Professor ASHLEY.

Prerequisite, required of freshmen who present two years of German for entrance and do not take French.

Elective Courses.

25. **I.** **INTERMEDIATE GERMAN.** — For sophomores; open upon arrangement to other students. Reading of such works as Sudermann's "Frau Sorge," "Wilhelm Tell," "Die Journalisten," etc. Grammar review.

3 class hours.

Credit, 3.

Assistant Professor JULIAN.

Prerequisites, German 1, 2 and 3.

26. **II.** **INTERMEDIATE GERMAN.** — For sophomores; open upon arrangement to other students. As stated under Course 25.

3 class hours.

Credit, 3.

Assistant Professor JULIAN.

Prerequisite, German 25.

27. **III.** **INTERMEDIATE GERMAN.** — For sophomores; open upon arrangement to other students. As stated under Course 25.

3 class hours.

Credit, 3.

Assistant Professor JULIAN.

Prerequisite, German 26.

28. **I. ADVANCED GERMAN.** — For sophomores; open upon arrangement to other students. Reading and studying of Goethe's most important literary productions.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisites, German 4, 5 and 6.

29. **II. ADVANCED GERMAN.** — For sophomores; open upon arrangement to other students. Development of the German novel; rapid reading of great novelists.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisite, German 28.

30. **III. ADVANCED GERMAN.** — For sophomores; open upon arrangement to other students. As stated under Course 29.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisite, German 29.

50. **I. SCIENTIFIC GERMAN.** — For juniors; seniors may elect. Reading in German of modern magazine articles and works of a scientific nature. Different work assigned according to needs of individual students.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisites, German 4, 5 and 6, or German 25, 26 and 27.

51. **II. SCIENTIFIC GERMAN.** — For juniors; seniors may elect. As stated under Course 50.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisite, German 50.

52. **III. SCIENTIFIC GERMAN.** — For juniors; seniors may elect. As stated under Course 50.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisite, German 51.

75. **I. GERMAN LITERATURE.** — Seniors. Advanced language and literary study. Conducted entirely in German. Lectures on German literature and history; life, customs and travel in Germany. Collateral readings, including masterpieces of different epochs, such as "Nibelungenlied," Goethe's "Faust" and one modern typical drama.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisites, German 28, 29 and 30.

76. **II. GERMAN LITERATURE.** — Seniors. As stated under Course 75.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisite, German 75.

77. **III. GERMAN LITERATURE.** — Seniors. As stated under Course 75.
3 class hours. Credit, 3.

Professor ASHLEY.

Prerequisite, German 76.

78. **I. CONVERSATION AND COMPOSITION.** — For seniors; juniors may elect. Translating connected English into German. Reproducing outside readings in German orally in class.

1 class hour.

Credit, 1.

Professor ASHLEY.

Prerequisites, German 4, 5 and 6, or German 25, 26 and 27.

79. **II. CONVERSATION AND COMPOSITION.** — For seniors; juniors may elect. As stated under Course 78.

1 class hour.

Credit, 1.

Professor ASHLEY.

Prerequisite, German 78.

80. **III. CONVERSATION AND COMPOSITION.** — For seniors; juniors may elect. As stated under Course 78.

1 class hour.

Credit, 1.

Professor ASHLEY.

Prerequisite, German 79.

MUSIC.

Elective Courses.

50. **I. HISTORY AND INTERPRETATION OF MUSIC.** — For juniors; seniors may elect. History of music among the ancients; medieval and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representatives of the classical school, — Bach, Händel, Haydn, Gluck and Mozart.

1 class hour.

Credit, 1.

Professor ASHLEY.

51. **II. HISTORY AND INTERPRETATION OF MUSIC.** — For juniors; seniors may elect. A continuation of Course 50. The Romantic school; Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera.

1 class hour.

Credit, 1.

Professor ASHLEY.

52. **III. HISTORY AND INTERPRETATION OF MUSIC.** — For juniors; seniors may elect. The Modern school and Modern composers.

1 class hour.

Credit, 1.

Professor ASHLEY.

DIVISION OF RURAL SOCIAL SCIENCE.

President BUTTERFIELD.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Agricultural Economics.

Professor CANCE, Assistant Professor SAWTELLE, Mr. MAGINNIS, Professor HART.

Instruction in agricultural economics is designed to show that the agricultural industry justifies its existence chiefly as a supplier of food and raw textile materials for human consumption; that agricultural success is measured by production of values rather than by production of volume of agricultural products; that the goal of the farmer is the largest net profit over a long-time period; that agricultural production includes all processes from purchase of seed and fertilizer and preparation of seedbed until the product reaches the consumer, including collection, transportation, storage, financing, packing, handling and selling; that a knowledge of the business of agriculture and agricultural commerce is to-day more necessary than a knowledge of agricultural technique.

The work of this department is conducted by means of lectures, readings and research in both library and field. A catalogue, now containing some 12,000 cards, covering the various phases of agricultural economics, is maintained. The department is also supplied with a large collection of maps, charts and statistical reports on the prices and supply of agricultural products. A goodly number of regular reports of the Bureau of Markets and other divisions of the United States Department of Agriculture are available for the use of students. Two series of bound volumes of bulletins are kept in the department offices, with duplicate series in the college library; one series already contains 12 volumes on "Co-operation in Agriculture," and the other, 15 volumes on "Marketing of Farm Products."

Required Course.

26. **II. AGRICULTURAL INDUSTRY AND RESOURCES.** — Sophomores. A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States are studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions.

4 class hours.

1 2-hour laboratory period, credit, 5.

Mr. MAGINNIS and Professor CANCE.

Elective Courses.

50. **I. ELEMENTS OF AGRICULTURAL ECONOMICS.** — For juniors; seniors may elect. Designed to accompany or follow the course in elements of economics. Deals with the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends;

the economic elements in the production and distribution of agricultural wealth; means of exchange; principles of rural credit; problems of land tenure and land values; taxation of farm property; and the maintenance of the economic status of the farmer. Lectures, text, readings, topics and field work.

5 class hours.

Credit, 5.

Professor CANCE.

51. **III. HISTORICAL AND COMPARATIVE AGRICULTURE.**—For juniors; seniors may elect. A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on the development of agriculture in New England. An attempt is made to measure the influence of times, peoples and countries in producing different systems of agriculture, and to ascertain the causes now working to effect agricultural changes. Lectures, readings and library work. Students in education and rural journalism should find this course helpful.

5 class hours.

Credit, 5.

Assistant Professor SAWTELLE.

52. **II. CO-OPERATION IN AGRICULTURE.**—For juniors; seniors may elect. The history, principles and business relations of agricultural co-operation. (1) A survey of the development, methods and economic results of farmers' organizations and great co-operative movements; (2) the business organization of agriculture abroad, and the present aspects and tendencies in the United States; (3) the principles underlying successful co-operative endeavor among farmers, practical working plans for co-operative associations, with particular reference to credit and purchase and the marketing of perishable products. Lectures, text, assigned readings and practical exercises.

5 class hours.

Credit, 5.

Professors CANCE and SAWTELLE.

53. **III. THE AGRICULTURAL MARKET.**—For juniors; seniors and graduate students may elect. A study of the forces and conditions which determine the prices of farm products and the mechanism, methods and problems concerned with transporting, storing and distributing them. Supply and demand, course of prices, terminal facilities, the middleman system, speculation in agricultural products, protective legislation, the retail market and direct sales are taken up. The characteristics and possibilities of the New England market are given special attention. Lectures, readings, assigned studies and field work.

5 class hours.

Credit, 5.

Professor CANCE.

75. **II. RURAL AND BUSINESS LAW.**—For seniors; juniors may elect. Land, titles, public roads, rights incident to ownership of live stock, contracts, commercial paper and distinctions between personal and real property. Text, written exercises, lectures and class discussions.

5 class hours.

Credit, 5.

Professor HART.

76. **II. TRANSPORTATION OF AGRICULTURAL PRODUCTS.** — For seniors and graduate students; juniors may elect. The development of highway, waterway and railway transportation and its relation to the agricultural development of the country; the principles governing the operation and control of transportation agencies; present-day problems relating to the shipment of farm products, rates, facilities and services; methods of reducing wastes in transportation; the economics of the good roads movement and of motor transportation. Lectures, text and field work.

5 class hours.

Credit, 5.

Professors CANCE and SAWTELLE.

77. **I. PROBLEMS IN AGRICULTURAL ECONOMICS.** — For seniors and graduate students; juniors may elect. An advanced course for those desirous of studying more intensively some of the economic problems affecting the farmer, such as: land problems, — land tenure, size of farms, causes affecting land values, private property in land, taxation of farm property; special problems, — cost of producing farm products, farm labor in New England, immigration, agricultural credit. Opportunity is given, if practicable, for field work, and students are encouraged to pursue lines of individual interest.

5 class hours.

Credit, 5.

Professor CANCE.

78. **III. AGRICULTURAL CREDIT FACILITIES.** — For seniors and juniors. Lectures, discussions and assigned readings on credit needs of farmers; the legitimate use of credit in the acquisition of land, and the production, storage and marketing of agricultural products; the development of national and State rural credit institutions and laws; the powers and methods of operation of credit institutions with reference to the supply of credit for agricultural purposes; the methods by which the individual may increase his credit standing and borrowing power; ways in which the present credit facilities may be increased.

3 class hours.

Credit, 3.

Assistant Professor SAWTELLE.

79. **I. AGRICULTURAL STATISTICS.** — For seniors, juniors and graduate students. The nature and sources of agricultural statistics, the methods of obtaining numerical facts, of analyzing and drawing conclusions from statistical data, and the methods of presenting in a true and forceful manner the statistical facts of the agricultural industry. Opportunity is given in the laboratory for practice in the use of statistical methods and processes, and to acquire experience in dealing with practical statistical problems. The application of statistics and statistical methods in the fields of agricultural economics, extension work, education, journalism and the business matters connected with farm operation is emphasized.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Assistant Professor SAWTELLE.

80. **I. SEMINAR.** — For seniors and graduate students. Research in agricultural economics and history; problems of New England agriculture. Library work and reports. If desirable some other topic may be substituted.

For the year 1921-1922, Seminars 80, 81 and 82 will be concerned, in the main, with salesmanship and advertising of agricultural products. Hours to be arranged.

1 2-hour conference period, credit, 2.

81. **II. SEMINAR.** — For seniors and graduate students. As stated in Course 80.

1 2-hour conference period, credit, 1 or 2.
The DEPARTMENT.

82. **III. SEMINAR.** — For seniors and graduate students. As stated in Course 80.

1 2-hour conference period, credit, 1 or 2.
The DEPARTMENT.

85. **II. AGRICULTURAL PRICES.** — For seniors and graduate students. A study of the prices of agricultural products and other commodities which are of importance in the agricultural industry. Limited to five students.

2 or 3 2-hour laboratory periods, credit, 2 or 3.
Assistant Professor SAWTELLE.

86. **III. AGRICULTURAL PRICES.** — For seniors and graduate students as stated in Course 85. Limited to five students.

2 or 3 2-hour laboratory periods, credit, 2 or 3.
Assistant Professor SAWTELLE.

Agricultural Education.

Professor HART, Professor WELLES, Mr. HEALD,¹ Miss HAMLIN.

The primary aim of the department is training students for service in some form of educational work. This service may be in one or more of several fields. Teaching is the most common, and includes vocational agriculture. Students contemplating preparation for State approval should confer as early as possible with the head of the department, to the end that they may secure a proper distribution of subjects and properly utilize vacations in acquiring the necessary farm practice. This department also serves as the avenue for recommending graduates to the State Department of Education for teaching positions, including such positions as require the State teachers' certificate.

The equipment includes a combination classroom and laboratory furnished with such articles as seem advisable for the effective work of a high school department of agriculture. This room represents to teachers in training the usable things for their work in a school department. The office of the department is equipped with books and pamphlets on agricultural education properly catalogued.

CO-OPERATION BETWEEN THE STATE DEPARTMENT AND THE COLLEGE.

Under an agreement with the Division of Vocational Education of the State Department of Education, the department of agricultural education is the co-operating agency at the college for the training of teachers of agriculture and other related subjects.

¹ Representing the State Department of Education in the administration of vocational education acts.

25. **II. AGRICULTURAL OPPORTUNITIES FOR WOMEN.** — For sophomores. Designed to show the woman who is interested in agriculture what opportunities there are for her in that field, and how she may best take advantage of them. The types of agricultural work for which women are best adapted are discussed. A study is made of some of the special problems which confront the woman farmer, and her best ways of solving them.

2 class hours.

Credit, 2.

Miss HAMLIN.

Elective Courses.

50. **I. EDUCATIONAL PSYCHOLOGY.** — A basic course for students looking forward to work in education, economics and sociology. The first part of the term is devoted to a study of the general notions of mental life and the explanation of psychological terms used in mental science; the anatomy and physiology of the nervous system and its relation to mental phenomena; and the fields of human activity in which psychology plays an important part. During the latter part of the term students are permitted to choose themes for the purpose of special study. These may be the psychology of teaching; the psychology of management; the psychology of crowds and other aspects of sociology; or the psychology of advertising, salesmanship or other phases of economics.

5 class hours.

Credit, 5.

Professor HART.

51. **I, II and III. PRINCIPLES AND METHODS OF TEACHING.** — For juniors; seniors may elect. Intended primarily for students expecting to teach. Others should consult the department before registering. Includes a study of the laws of learning, exhaustive inquiry into the meaning of interest, apperception, memory-images, judging and reasoning, and their applications in teaching processes; class management and the organization of lesson plans.

5 class hours.

Credit, 5.

Professor WELLES.

52. **III. HISTORY AND PHILOSOPHY OF EDUCATION.** — For juniors; seniors may elect. A study of educational history in modern times, educational movements in the United States and their bearing on national aims and ideals, with special emphasis on education for a democracy.

5 class hours.

Credit, 5.

Professor WELLES.

75. **II. ORGANIZATION AND SUPERVISION OF SECONDARY EDUCATION.** — For seniors; juniors may elect. School systems, courses of study, training of teachers, financial support, recent tendencies and policies in secondary and junior high schools.

3 class hours.

Credit, 3.

Professor WELLES.

76. **I, II and III. SPECIAL METHODS IN TEACHING VOCATIONAL AGRICULTURE.** — For seniors; juniors and others qualified may elect. Students must consult the head of the department or the professor in charge before registering for this course. Work consists of outlining lessons and projects for the teaching of agriculture or related subjects in agricultural schools or depart-

ments; the application of principles of vocational education as embodied in the Smith-Hughes Act and other legislation relative to agricultural education; the necessary adjustments relating to the school, community and administrative officials.

3 class hours.

Credit, 3.

Professor WELLES.

77. **II. COUNTY AGENT WORK.** — For seniors. Consists of work in special agricultural problems by individual students; preparation and presentation of a number of theses, using charts and other apparatus. Major advisers are responsible for the accuracy of subject-matter; the department of agricultural education is responsible for preparation and presentation. One lecture and one laboratory period scheduled; three laboratory periods by arrangement.

Credit, 5.

Professor HART.

78. **III.** As described in Course 77.

Credit, 5.

80. **I, II, III and IV. SUPERVISED TEACHING.** — For seniors and graduate students. Supervised teaching (*a*) in county agricultural schools or high school departments of agriculture under the direction of the State Department of Education and the college department of agricultural education in accordance with a joint agreement; or (*b*) under the supervision of this department only. Besides teaching, the student is required to pursue a course of professional study bearing upon the subject taught, to arrange the subject-matter for lessons, and to outline teaching projects. The number of credits depends upon the number, character and length of teaching exercises and conferences. Scheduled by arrangement.

Under certain conditions a student may absent himself from college during one term of his senior year for supervised teaching. For detailed information regarding this matter consult the department.

Credits, 1 to 5.

Professor WELLES.

90. **III. GENETIC PSYCHOLOGY.** — For seniors; juniors may elect. A study of the physical and mental growth and development of the individual from birth to maturity; a comparative study of the physiological and mental ages of children; and mental tests.

3 class hours.

Credit, 3.

Professor HART.

91. **I. RURAL EDUCATION.** — For graduates; seniors may elect. A study of the development of the rural school; its organization and administration; its function for the community and for the individual; its place in the State system; some local surveys.

3 class hours.

Credit, 3.

Professor HART.

Rural Sociology.

Professor PHELAN, President BUTTERFIELD, Professor SIMS, Mr. NOVITSKI.¹

The courses in rural sociology are designed for two purposes: first, to give students an appreciation of the general problems of country life; second, to afford a definite training for students who wish to take up some specific form of social service. In the last ten years rural sociology has been introduced as a subject into more than 50 per cent of the agricultural schools and colleges. There is a good demand for teachers, and an increasing opportunity in other directions in this subject. The courses afford the student an opportunity to pursue graduate as well as undergraduate work. The library of the college is unusually well equipped with rural sociological material.

Required Course.

27. **III. ELEMENTS OF RURAL SOCIOLOGY.** — Sophomores. A broad survey of the field of rural sociology, including such topics as the origin of rural sociology, its methods and problems; relation of sociological to the scientific and technical aspects of agricultural problems; the development of the rural community in New England and the west, religious, educational and social ideals of rural people; characteristics and influence of the rural environment, the movement of the rural population, the effects of immigration; rural institutions, the school, the church, local government, effects of modern conditions of life on rural institutions; rural organization; problems of progress, an analysis of the needs of rural life in its further development. Lectures, readings and essays on assigned topics.

3 class hours.

Credit, 3.

Professor SIMS.

Elective Courses.

50. **I. SOCIAL CONDITION OF RURAL PEOPLE.** — For juniors; seniors may elect. A. The rural status: composition of the rural population, nature, extent and causes of diseases and accidents, health agencies of control; extent and causes of rural delinquency and dependency, conditions of temperance, of morality and family integrity; child labor, women's work and position; standard of living, size of family; cultural ideals; community consciousness and activity; standards of business conduct and of political ethics.

B. Rural social psychology: characteristics of the rural mind, character of hereditary and environmental influence; nature and effect of face-to-face groups; fashion, conventionality, custom, character of discussion and of public opinion.

3 class hours.

Credit, 3.

Professor SIMS.

51. **II. RURAL GOVERNMENT.** — For juniors; seniors may elect. A general survey of the development of rural government in the United States, origin of the New England town, its influence upon the west, county government, the influence of the farmer in legislation, good roads movement, credit facilities, taxation, boards of agriculture, agricultural colleges and experiment stations in relation to rural welfare; national government; a general survey

¹ On leave of absence.

of political organizations and movements among farmers in the United States and foreign countries and their influence in shaping legislation; relation of the Department of Agriculture, postal system, the various national commissions and agencies to rural welfare. Lectures, readings, written exercises on assigned topics.

3 class hours.

Credit, 3.

Professor SIMS.

52. **III. RURAL ORGANIZATION.** — For juniors; seniors may elect. A study of the organized agencies by which rural communities carry on their various forms of associated life, particularly a study of the ways by which the domestic, economic, cultural, religious and political institutions contribute to rural betterment; principles underlying leadership, qualifications of the paid leader and the lay leader; the field of rural social service, national, State and local, preparation and opportunity for service; rural community building, a study of organized ways and means by which aid is given local communities. The method, scope and history of local, State and national associations formed about some farm product, their influence in forming class consciousness and in shaping agrarian legislation; need of federation. Lectures, readings and essays on assigned topics.

3 class hours.

Credit, 3.

President BUTTERFIELD.

76. **I. FIELD WORK IN RURAL SOCIOLOGY.** — For seniors; juniors may elect. Designed to meet the needs of students who wish to do some constructive work in rural social service while still in college. The work is carried on in co-operation with the various college agencies engaged in rural service. Any project for which credit in this course is to be asked must first have the approval of the head of the department.

From 2 to 6 laboratory hours, credits, 1 to 3.

Professor PHELAN.

Prerequisites, Rural Sociology 27 and 52.

77. **II. RURAL SOCIAL SURVEYS.** — For seniors; juniors may elect. A careful study of the theory and function of statistics, the limitations and difficulties in the use of statistics, the interpretation of statistical data, various methods of graphic representation; a study of surveys, kinds and use, method of gaining information, the basis for conclusions, value of information gained. Text and lectures.

3 class hours.

Credit, 3.

Professor SIMS.

79. **I. SEMINAR.** — Enrollment is limited to students who have had at least three courses in rural sociology, and to students majoring in the subject.

Credits, 1 to 3.

Professor PHELAN.

80. **II. SEMINAR.** — Enrollment is limited to students who have had at least three courses in rural sociology, and to students majoring in the subject.

Credits, 1 to 3.

Professor PHELAN.

81. **III. SEMINAR.** — Enrollment is limited to students who have had at least three courses in rural sociology, and to students majoring in the subject.

Credits, 1 to 3.

Professor PHELAN.

Rural Home Life.

Miss SKINNER, Miss GRIZZLE.

The Department of Rural Home Life offers elective courses for students majoring in other departments of the college. Fundamentally this training is such as will help young women to be better prepared to adjust themselves readily to their environment in the home and in the community, and to help them realize their responsibility as good homemakers and as good citizens.

The food laboratory, located in the entomology building, is fitted with individual desks (cabinet form) to hold utensils and materials for each student. Each table is equipped with gas stoves. A storage cabinet is provided with bins for supplies and cupboard space for large utensils and illustrative material. This room is well lighted and pleasant. The clothing laboratory is located in the Adams House. The equipment consists of sewing machines, cabinets, work tables, cutting tables, electric irons, dress forms and a collection of materials illustrating the production of textiles for clothing and household use.

Required Courses.

2. **II. INTRODUCTION TO HOME ECONOMICS.** — Freshmen women. Lectures on the history and evolution of the home; social customs and their value in family relationships; healthful and suitable care of the wardrobe; principles of nutrition as applied to the student's life; the student's budget, and the keeping of personal accounts.

2 class hours.

Credit, 2.

Miss SKINNER.

Elective Courses.

25. **I.** 26. **II.** 27. **III. TEXTILES AND CLOTHING.** — Sophomores. The selection and purchase of suitable materials, their character, cost and durability. Appropriateness and simplicity in dress. Practical work in hand and machine sewing, drafting and designing of patterns, the care and repair of clothing.

1 lecture.

2 2-hour laboratory periods, credit, 3.

Miss GRIZZLE.

50. **I.** 51. **II.** 52. **III. FOODS AND COOKERY.** — Juniors. Fundamental knowledge of foods. Lectures deal with a discussion of the comparative composition, cost and economic value of foodstuffs; their sources, production and manufacture. Laboratory practice in applying scientific principles to the selection and preparation of typical foods.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Miss SKINNER.

75. **I.** 76. **II. HOUSEHOLD MANAGEMENT.** — Seniors. The application of the principles of scientific management to the household, and the elements of successful home making. The family income, cost of living, household ac-

counts, the budget and its apportionment. The responsibility of the woman to her family and the community in establishing right standards of living.

2 class hours.

Credit, 2.

Miss SKINNER.

78. **III. HOME NURSING.** — Seniors. A study of the care of the family health; simple diseases and their prevention; the care of young children and invalids; first aid to the injured.

2 class hours.

Credit, 2.

Miss SKINNER.

GENERAL DEPARTMENTS.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Military Science and Tactics.

Major FREDERICK E. SHNYDER, Cavalry, U. S. A.; Major HERMAN KOBBE, Cavalry, U. S. A.; Captain JAMES V. V. SHUFELT, Cavalry, U. S. A.; Captain THOMAS BRADY, JR., Cavalry, U. S. A.; Technical Sergeant JOHN J. LEE, U. S. A., Retired; Staff Sergeant JAMES A. WARREN, Cavalry; and a detachment of enlisted men of the United States Army.

Under act of Congress (July 2, 1862) military instruction under a regular army officer was required in this college of all able-bodied male students. Under act of Congress June 3, 1916, as amended by act of Congress Sept. 8, 1916, there was established at this college in April, 1917, an infantry unit of the Reserve Officers' Training Corps. Following the World War and an act of Congress (July 9, 1918) the Reserve Officers' Training Corps is in operation under the regulation of the War Department, administered by the president of the college and the professor of military science and tactics.

Beginning with the fall term, 1920-21, the infantry unit of the Reserve Officers' Training Corps was converted into a cavalry unit.

The primary object of the Reserve Officers' Training Corps is to provide systematic military training at civil educational institutions, for the ultimate purpose of qualifying selected students of such institutions as reserve officers in the military forces of the United States. It is intended to attain this object during the time the students are pursuing their general or professional studies, with the least practicable interference with their civil careers, by employing methods designed to fit men physically, mentally and morally for pursuits of peace as well as war.

All candidates for a degree in a four-year course must take for two years at least three hours a week of military training.

Students in their junior and senior years, who are approved by the president and the professor of military science and tactics, may take the advanced course if they so elect. The advanced course consists of at least five hours per week and a summer camp of about six weeks during the summer vacation, between the junior and senior years. Students taking this course are paid by the Federal government at a rate to be fixed by the Secretary of War, not to exceed the value of the army ration. The rate now fixed is 40 cents per day, which amounts to about \$146 per year. Students graduating in the advanced course are eligible for commissions in the Officers' Reserve Corps, *but are not required to accept such commissions if offered.*

The required uniform is of olive drab woolen cloth, and is furnished for the use of the students by the Federal government without cost. It is worn by all cadets when on military duty. New uniforms are furnished each year.

The course for cavalry units of the Reserve Officers' Training Corps includes theoretical and practical instruction in all phases of cavalry work, so distributed over the four-year college course as to qualify students at the end of the freshman year as privates of cavalry; at the end of the sophomore year as non-commissioned officers of cavalry; and upon graduation as reserve officers.

The instruction in this department covers cavalry drill, cavalry weapons, — *i.e.*, rifle, pistol, saber, automatic rifle and machine gun, — map reading and military sketching, minor tactics, equitation, etc. The course in equitation includes cross country riding and instruction in polo. So far as season and weather permit, instruction is of a practical nature out of doors.

Required Courses.

1. **I.** — Freshmen. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, AND ASSISTANTS.

2. **II.** — Freshmen. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, AND ASSISTANTS.

3. **III.** — Freshmen. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, AND ASSISTANTS.

25. **I.** — Sophomores. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, AND ASSISTANTS.

26. **II.** — Sophomores. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, AND ASSISTANTS.

27. **III.** — Sophomores. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, AND ASSISTANTS.

Elective Courses.

50. **I.** — Juniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, AND ASSISTANTS.

51. **II.** — Juniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, AND ASSISTANTS.

52. **III.** — Juniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, AND ASSISTANTS.

75. **I.** — Seniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, AND ASSISTANTS.

76. **II.** — Seniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, AND ASSISTANTS.

77. **III.** — Seniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, AND ASSISTANTS.

Physical Education and Hygiene.

Professor HICKS, Assistant Professor GORE, Mrs. HICKS, Mr. GRAYSON, Mr. MANSELL, Mr. DERBY.

The purpose of the courses offered by this department is to provide active exercise and to instruct every student how to care for his health and maintain his physical condition while carrying on his college course.

The equipment consists of the Alumni Athletic Field, which has room for two football fields, a quarter-mile cinder track with a 220 straightaway, and the baseball diamond; and also the old field for class football and baseball, two tennis courts, and the drill hall floor for basket-ball. For several years the drill hall floor was used for class work in gymnastics, but its condition has become so bad that this has been discontinued. During the winter months a hockey rink is provided on the college pond.

[All undergraduate male students are given a physical examination upon entering.]

MEN.

Required Courses.

1. **I. HYGIENE.** — Freshmen. Lectures on personal hygiene.
1 class hour.

Credit, 1.

Professor HICKS.

2. **I. RECREATION.** — Freshmen. Outdoor games.
1 laboratory hour. Credit, third term.
Mr. GRAYSON.

3. **III. RECREATION.** — Freshmen. Outdoor games.
1 laboratory hour. Credit for Nos. 2 and 3, 1.
Mr. MANSELL.

25. **I. RECREATION.** — Sophomores. Outdoor games.
1 laboratory hour. Credit, third term.
Mr. MANSELL.

26. **III. RECREATION.** — Sophomores. Outdoor games.
1 laboratory hour. Credit for Nos. 25 and 26, 1.
Mr. MANSELL.

Elective Course.

77. **III. TRAINING COURSE.** — Seniors. Election by permission only.
History of physical education and supervision of athletics.
1 class hour. Credit, 1.
Professor HICKS.

WOMEN.

Required Courses.

4. **I. RECREATION.** — Freshmen. Outdoor games.
3 laboratory hours. Credit, 1.
Mrs. HICKS.

5. **II. GYMNASTICS.** — Freshmen. Dancing, Swedish games, etc.
3 laboratory hours. Credit, 1.
Mrs. HICKS.

6. **III. RECREATION.** — Freshmen. Outdoor games.
3 laboratory hours. Credit, 1.
Mrs. HICKS.

27. **I. RECREATION.** — Sophomores. Outdoor games.
3 laboratory hours. Credit, 1.
Mrs. HICKS.

28. **II. GYMNASTICS.** — Sophomores. Dancing, Swedish games, etc.
3 laboratory hours. Credit, 1.
Mrs. HICKS.

29. **III. RECREATION.** — Sophomores. Outdoor games.
3 laboratory hours. Credit, 1.
Mrs. HICKS.

Elective Courses.

50. **II. GYMNASTICS.** — Juniors. Dancing, Swedish games, etc.
3 laboratory hours. Credit, 1.
Mrs. HICKS.

76. **II. GYMNASTICS.** — Seniors. Dancing, Swedish games, etc.
3 laboratory hours. Credit, 1.
Mrs. HICKS.

THE LIBRARY.

The library — stack room, reading room and office — occupies the entire Chapel building. It contains about 70,000 catalogued volumes, several thousand volumes not catalogued, and a large number of bulletins, farm papers and other material, which is being put into good working order as fast as possible. Works on agriculture, horticulture, botany, entomology and the various sciences predominate, but literature, history and sociology are well represented and receive due attention. The reading room provides a good variety of popular and technical periodical literature, encyclopedias and general reference books.

The library is being reclassified and recatalogued in order to make the splendid material accessible and of the greatest working value. Every effort is being made toward developing the college library into a vital intellectual center, of equal value to every student, teacher and teaching department on the college campus. Consequently only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and deportment are enforced. An agricultural reference library is maintained in Stockbridge Hall, and department libraries are also maintained in some of the other buildings on the campus.

Occasional lectures are given to regular and short-course students in order to make the best use of the library equipment. Emphasis is laid upon the card catalogue, periodical indexes, bibliographies and guides, and the large collections of United States Department of Agriculture and experiment station literature.

Library hours are from 8 A.M. to 9.30 P.M. every week day, and from 9 A.M. to 1.30 P.M. on Sundays in term time. Shorter hours prevail during vacation.

THE GRADUATE SCHOOL

THE GRADUATE SCHOOL.

KENYON L. BUTTERFIELD, A.M., LL.D., President of the College.

CHARLES E. MARSHALL, Ph.D., Director of the Graduate School and Professor of Microbiology.

GRADUATE STAFF, 1921-22.

Professor ANDERSON, Professor BEAUMONT, Professor CANCE, Professor CHAMBERLAIN, Assistant Professor O. L. CLARK, Professor CRAMPTON, Professor FERNALD, Professor HAERT, Assistant Professor ITANO, Professor LINDSEY, Professor OSMUN, Professor PETERS, Professor PHELAN, Professor SALISBURY, Professor SEARS, Professor SHAW, Professor SIMS, Professor WAUGH, Professor WELLS, Director MARSHALL, President BUTTERFIELD; Mr. WATTS, Secretary.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years; the degrees of master of agriculture and doctor of agriculture are now granted to meet strictly professional needs. The number of requests for each of these courses is apparently increasing. In recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station specialists in farm management, dairying, live-stock husbandry, poultry science, agronomy, landscape gardening, pomology, vegetable gardening and floriculture; for positions as bacteriologists, botanists, chemists, entomologists; for economists and social workers; and for numerous other positions requiring a great amount of scientific and professional knowledge, training and experience.

ORGANIZATION.

The school is based upon the department as the unit, and the apprenticeship system as the most effective means of instruction. This gives to the student individuality in treatment and an intimacy with actual conditions of work and operations. Besides, each student is assigned to an advisory committee, composed of the instructor in charge of his major subject as chairman, and instructors in charge of his minor subjects as members, which directs his graduate studies. The chairmen of all these committees together constitute the graduate staff, which controls the policy of the graduate school.

ADMISSION.

Admission to the graduate school will be granted:—

1. To graduates of the Massachusetts Agricultural College.
2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects

for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the instructor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for membership in the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

NATURE, METHODS AND REQUIREMENTS OF GRADUATE WORK.

Graduate work differs from undergraduate work in its purposes and methods. The primary aims of the instructor are emphasized in an attempt to have the student adjust himself and place himself in his environment; develop the rule of self-direction and self-instruction; acquire the power of accurate reasoning; gain proficiency and skill in his selected field of study or practice; and obtain an appreciative and discriminative insight into experimentation and original research. Methods are not devised, therefore, for attractiveness, entertainment and superficial reviews, but for the creation of initiative and profound thought, thorough acquaintance with detail, independent advance and industrious habits. Careful readings, lectures, conferences, surveys, laboratory exercises and field work are some of the agencies utilized.

All members of the graduate school are required to attend the course of lectures designed to supplement the technical work of all graduate studies. These lectures will be given once each week, and the students will be held responsible for the work.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as a major and the other as a minor. These subjects may not be selected in the same department. An original thesis is considered a part of the major subject.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major and the others as minors. No two of these subjects may be taken in the same department. An original thesis shall be considered a part of the major subject.

Candidates for the degree of master of agriculture are allowed greater privileges in the selection of subjects, but will be required to select a major and such other supporting lines of study as will be necessary to equip properly the individual professionally.

Candidates for the degree of doctor of agriculture are required to select a major and such other subjects as will develop the major in its greatest intensity and comprehensiveness. Successful experience is also requisite, together with a thesis which represents a masterly survey or intimate study through accurate application of some phase of the major subject.

Candidates for the degree of master of landscape architecture will be expected to conform to the established courses of the department, and to the requirements of the department in the preparation of a thesis, as well as in actual experience outside the college.

Candidates for membership in the graduate school who do not desire to work for a degree may, with the approval of the director of the school, take more than one subject in the same department, or pursue work in several departments, if their preparation will permit. A statement of the subjects chosen must in each case be submitted to the director of the graduate school for approval. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

The graduate staff reserves the privilege of recommending and allowing courses in other institutions as a part of residence instruction. Such supervision will be exercised and credit granted as are essential to the highest standards of efficiency.

THESES.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject; must show that its writer possesses the ability to carry on original study; and must be an actual contribution to knowledge.

The thesis in its final form must be submitted to the director by May 15 of the year in which the student is to present himself for the advanced degree, and before he may take the required examination. Three complete copies are required. One of the said copies is to be retained as an official copy by the said director, one is to be deposited in the college library, and the third is to be retained by the department in which the thesis was prepared. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in his thesis.

FINAL EXAMINATIONS.

For the degree of master of science, master of agriculture, or master of landscape architecture, a final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degrees of doctor of philosophy and doctor of agriculture, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

DEGREES CONFERRED.

The degrees of master of science, master of agriculture and master of landscape architecture are conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half¹ to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence. In the case of a master of landscape architecture the student must follow the prescribed course of study.

¹ All time statements refer to minimum time.

2. The earning of not less than fifty credits in the chief or major subject, and of not less than twenty-five credits in the minor subject. Students pursuing the course in landscape architecture will devote all of their time to the established course, and meet the conditions of one year of experience outside the college.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The degrees of doctor of philosophy and doctor of agriculture are conferred upon graduate students who have met the following requirements:—

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.

2. The earning of not less than one hundred credits in the chief or major subject, and of not less than twenty-five credits in each of two minor subjects.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge and accompanied by drawings if necessary. For the degree of doctor of agriculture the thesis may be modified to meet professional requirements.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the instructors in charge.

5. A public oral examination.

6. The payment of all fees and college expenses required.

The fee for the degree of master of science, master of agriculture, or master of landscape architecture is \$10, and for the degree of doctor of philosophy or doctor of agriculture, \$25.

COURSES OFFERED.

Courses available as major subjects for the degree of doctor of philosophy:—

Agricultural economics.
Botany.
Chemistry.
Entomology.

Horticulture.
Microbiology.
Rural sociology.

Courses available as major subjects for the degree of master of science:—

Agricultural economics.
Agricultural education.
Agriculture.
Agronomy.
Animal husbandry.
Botany.
Chemistry.

Entomology.
Horticulture.
Mathematics and physics.
Microbiology.
Poultry science.
Rural sociology.
Veterinary science.

Courses available as major subjects for the degree of master of agriculture:—

Agronomy.

Animal husbandry.

Poultry science.

The course in landscape architecture leads to the degree of master of landscape architecture.

Courses available as minor subjects: —

Agricultural economics.
Agricultural education.
Agriculture.
Agronomy.
Animal husbandry.
Animal pathology.
Botany.
Chemistry.

Entomology.
Horticulture.
Landscape architecture.
Mathematics and physics.
Microbiology.
Poultry science.
Rural sociology.
Zoölogy.

GENERAL OUTLINE OF COURSES FOR ADVANCED DEGREES.

Agricultural Economics (Major Course). — 1. Graduate research work in agricultural economics will be developed by four principal methods, namely, historical, statistical, accounting and general field investigation. In all instances mastery of research methods includes facility in investigation, tabulation and interpretation of results.

2. Candidates for the doctor's degree will be required to write a thesis satisfactory to the department and graduate staff, and candidates for the master's degree, a thesis or a report satisfactory to the department, covering results of a specific line of personal investigation in one or more fields of the subject. Each candidate will also be required to have a working knowledge of the general field of economics, the theory of agricultural economics, the problems of agricultural production, land tenure, land problems, agricultural commerce, agricultural co-operation, agricultural credit, statistics of agriculture and prices, and markets and marketing.

3. Following are the general course requirements and prerequisites for graduate work: —

I. Prerequisites for all graduate work.

Economics and Sociology 51 (elements of economics), or its equivalent.

Agricultural Economics 26 (agricultural geography, commerce and industry).

Agricultural Economics 50 (elements of agricultural economics), or equivalent courses.

II. Additional requirements for doctorate, master's degree or first minor of a doctorate.

Agricultural Economics 51, 52, 53 and 79. These courses, specially arranged for graduates, may be taken as Courses 120, 170, 155 and 180 for graduate credit.

Rural Sociology 27 and 50, or equivalent courses.

Economics and Sociology 50 and 77 (money and banking and public finance), or equivalent courses.

III. Candidates for the master's or doctor's degrees must take Courses 110, 111, 130, 165 and 175.

GRADUATE COURSES IN AGRICULTURAL ECONOMICS.

110. THEORY OF AGRICULTURAL ECONOMICS. — Readings in French, German and English on economics of agriculture. Alternate years, odd. 200 hours, 3 credits.

Professor CANCE.

111. CURRENT ECONOMIC PROBLEMS AND LITERATURE. — Department seminar throughout the year. 1 credit each term.

120. HISTORICAL AND COMPARATIVE AGRICULTURE. — General survey. May be taken in connection with Course 51. Spring term, yearly. 3 credits.
Assistant Professor SAWTELLE.

121-122. HISTORY OF AMERICAN AGRICULTURE. — Special studies in the history of agricultural institutions, practices or relations. Fall term, even years. 5 credits.
Assistant Professor JEFFERSON.

130. PROBLEMS OF AGRICULTURAL PRODUCTION. — The relation of the farmer to the food supply. May be taken in connection with Course 77. Fall term, yearly. 5 credits.
Professor CANCE.

140. LAND TENURE AND THE ACQUISITION OF FARM LAND. — Readings, discussion, original exercises. Alternate years, even. 3-5 credits.
Professor CANCE.

145. FARM LABOR. — Reading and investigation. 3 credits.
Professor CANCE.

150. AGRICULTURAL COMMERCE, INDUSTRY AND TRADE. — A study of trade movements and commercial activities relating to agricultural products. Fall term, alternate years, odd. 3-5 credits.
Assistant Professor JEFFERSON.

155. THE AGRICULTURAL MARKET. — A study of the forces, methods and institutions of the market for agricultural products. Spring term, yearly. 5 credits.
Professor CANCE.

156. SPECIFIC PROBLEMS IN MARKETING FARM PRODUCTS. — Reports and discussions. Alternate years, odd. 3 credits.
Professor CANCE.

160. AGRICULTURAL PRICES. — Winter term, yearly. 3 credits.
Assistant Professor SAWTELLE.

161. AGRICULTURAL PRICES. — Spring term, yearly. 3 credits.
Assistant Professor SAWTELLE.

165. TRANSPORTATION OF AGRICULTURAL PRODUCTS. — Elementary discussion and report. Winter term, yearly. 5 credits.
Professor CANCE.

166. SPECIFIC TRANSPORTATION PROBLEMS. — Original study, reading and report on certain transportation problems related to agriculture. Alternate years, odd. 3-5 credits.
Assistant Professor SAWTELLE.

170. CO-OPERATION IN AGRICULTURE. — Elementary problems and discussion. May be taken in connection with Course 50. Winter term, yearly. 5 credits.
Professor CANCE.

171, 172. SPECIAL PROBLEMS IN CO-OPERATION FOR ECONOMIC PURPOSES. — Study, original investigation and discussion. Every third year, beginning 1922. 3-5 credits.

Professor CANCE.

175. AGRICULTURAL CREDIT. — Readings and reports in addition to class lectures on agricultural credit. Taken in connection with Course 78. Spring term, yearly. 3-5 credits.

Assistant Professor SAWTELLE.

180. ELEMENTARY PRINCIPLES OF STATISTICS. — Chiefly related to agriculture. Lectures, laboratory studies and original work. Taken in connection with Course 79. Fall term, yearly. 5 credits.

Assistant Professor SAWTELLE.

181. SPECIFIC PROBLEMS IN STATISTICS OF AGRICULTURE. — Alternate years, even. 3-5 credits.

Assistant Professor SAWTELLE.

185. RURAL LAW. — Corresponds to Course 78. Spring term, yearly. 5 credits.

Professor HART.

186. STUDIES IN AGRICULTURAL LEGISLATION. 3-5 credits.

The DEPARTMENT.

190-195. INVESTIGATION OF VARIOUS PROBLEMS RELATED TO AGRICULTURAL ECONOMICS. — Credit given on basis of time spent and reports submitted.

200. THESIS. — Credits on basis of work accomplished.

Agricultural Education. — Graduate work is offered in this department as a major or a minor for the degree of master of science, and as a minor for the degree of doctor of philosophy.

1. *Prerequisites for Major Study.* — A minimum of 25 credits distributed among the following lines of study: history of philosophy; descriptive, educational, genetic or experimental psychology; history of education; principles and methods of teaching; school organization and administration and a half year's experience in teaching. Students of rural education will also be required to have some knowledge of rural sociology and economics unless their minor is in one of these fields.

2. *Graduate Study.* — The lines of graduate study are represented by the following courses. A minimum of 50 credits is required.

100. History of Agricultural Education,	1-10 credits.
105. Principles and Methods of teaching Agriculture and Agricultural Science,	1-20 credits.
110. Rural Education — Its Organization and Administration,	1-20 credits.
115. Supervision and Administration of Agricultural Education,	1- 5 credits.
120. Theory of Vocational Education,	1-10 credits.
125. Preparation of Teachers of Agriculture,	1-10 credits.
130. General Educational Theory and Practice,	1-15 credits.
135. Educational Literature,	1-10 credits.
140. Educational Research,	1-10 credits.
150. Thesis,	15-25 credits.

Some of the above courses are intended to give extended and more intensive work than corresponding undergraduate courses. In planning the work of any individual student only such of the above courses will be required as have some bearing upon his problem either in an immediate or supportive way.

Graduates of other than agricultural colleges who wish to take their major work in some phase of rural education will be required to present evidence of a knowledge of rural life and rural industries both scientific and practical. This may involve the study of numerous undergraduate courses in agriculture or horticulture without graduate credit.

1. *Prerequisites for Minor Study.* — A total of 15 credits of undergraduate work, 5 of which must be in the history of education.

2. *Graduate Study.* — A minimum of 25 credits of graduate study. These may be earned in undergraduate courses which the student has not had, or in any of the graduate courses which have a bearing upon the objective of his major work.

Agronomy (Master of Science). — Graduate students desirous of taking major work in agronomy should have had a good training in the fundamentals of the natural sciences, since agronomical problems involve the application of the natural sciences especially. They should have taken Agronomy 27 and 50, or their equivalents, and other courses given by this department along the line of the problem on which they will work, and should have a command of the laboratory technique required for their problems. Problems may be chosen in which particular attention is devoted to soils, fertilizers or field crops. The specific problem is selected in conference with the major adviser, consideration being given to the student's desires and abilities.

Although this department does not attempt to limit the field of research in agronomy, the following phases are suggested to the prospective graduate student: —

151. **FIELD CROP PRODUCTION.** — (a) Varieties: Classification; adaptation to climatic and soil conditions, etc.

(b) Distribution as affected by natural and economic conditions.

(c) Cultural methods: Early and late planting of the potato seed crop, of silage corn; spacing of plants; keeping qualities as affected by time and methods of harvesting; tillage and moisture control, etc.

(d) Storage of cereals, roots and tubers as affected by aeration, temperature, humidity, previous treatment, etc.

175. **SOIL TECHNOLOGY.** — Soil Physics. Textural relationships of soil classes; adsorption phenomena; physical properties in relation to mineralogical and chemical properties; soil structure; moisture relationships; the colloidal conditions of soils, etc.

177. **SOIL FERTILITY.** — (a) Soil Chemistry. Nitrogen fertilization, including commercial supply and gain or loss under different systems of soil management; absorption of potash and phosphoric acid; sulfur fertilization; soil acidity, etc.

(b) Soil Biology. Fixation of nitrogen by symbiotic and nonsymbiotic organisms; changes of green and animal manures in the soil, — ammonification and nitrification; care and preservation of manures; humus in relation to soil fertility, etc.

178. **CROP IMPROVEMENT.** — Involves the application of the principles of plant-breeding to special crops.

After the selection of a topic for investigation the student is required to

formulate the problem in detail, develop a line of attack, carry on the work and present the results in a thesis acceptable to the staff of the Graduate School. The student is required to familiarize himself with the literature bearing on the subject.

A graduate student taking a minor in this department will be required first to take certain of the regular courses offered by the department, unless he has already had them or their equivalents. The work assigned will then depend somewhat on the time required to complete these courses.

It is the aim of the department to supply laboratory, greenhouse and field facilities for attacking agronomical problems through most of the known means. These facilities are intended primarily for the use of graduate students doing major work in agronomy, but others will be allowed to use them when circumstances permit.

Animal Husbandry (Master of Science). — **COURSE A. ANIMAL BREEDING.** — 101. *Reading.* — Thorough survey of the scientific works dealing with plant and animal breeding and improvement.

102. *Project.* — Each student must outline and pursue some Mendelian problem.

103. *Thesis.* — This is to be a complete treatise of the problem which the student undertakes; it should be a valuable contribution to the present knowledge of the question of animal breeding.

COURSE B. ANIMAL NUTRITION. — This course is in outline similar to A. It is designed to cover the field of nutrition, feeding and management of live stock.

110. *Seminar.* — Regular periods will be devoted to a discussion of the projects undertaken, together with criticisms of the available material on the question pursued.

111. *Reading.* — The student is to make a very complete survey of experimental and periodical literature dealing with the various phases of the subject.

112. *Practice.* — Before the completion of the work for the degree, the student must have the equivalent of at least one year's continuous work on an approved live-stock farm.

113. *Conferences.* — Regular periods to discuss progress of the work.

Animal Pathology (Minor Course only). — 101. *Reviews in anatomy.*

102. *Reviews in organography and histology.*

110. *Special lectures and readings in general and special pathology.*

111. *Laboratory studies in general and special pathology.*

112. *Pathological technique.*

120. *Conferences.*

Botany (Major Courses). — The equivalent of certain undergraduate courses, determined in the case of each student by the department, is prerequisite. Candidates for the degree of master of science are required to pass a final examination in writing. A final examination in writing before the department and an oral examination before the graduate staff must be passed by candidates for the degree of doctor of philosophy. Candidates for the latter degree are required to attend all graduate lectures given by the department. Candidates for the degree of master of science will take those lectures given during their period of study in the department. All lecture courses will be given in rotation, except Courses 100 and 101, which will come every year. There will be at least three lectures a week throughout the fall, winter and spring terms. These lecture Courses 100 to 107, outlined below, are designed to cover a period of three years.

100. PLANT PHYSIOLOGY. — The lectures will consider, under the nutrition of the plant: its chemical structure, absorption of various nutrient substances and their changes in the plant, assimilation and dissimilation of carbon and nitrogen by autotrophic and heterotrophic plants; under changes in the form of plants: growth and form under constant external factors, the influence of variable external and inner factors on growth, form and development; and under plant movements: the various tropisms, nutations, etc. Supplemental demonstrations, laboratory work and readings in the standard texts and journals. One lecture a week for 36 weeks.

101. PLANT PATHOLOGY. — A general consideration of the history, nature and causes of plant disease; parasitism, predisposition, immunity, degeneration, natural and artificial infection, dissemination, epidemics, biologic strains, monstrosities and malformations, proliferation, prevention and control, economics of plant diseases. One lecture a week for 36 weeks.

102. NORMAL AND PATHOGENIC METABOLISM. — The lectures in this subject embrace, in more or less detail, comparative consideration of the metabolism of the host in health and disease; the metabolism of the parasite under varying conditions; enzyme activities in host and parasite; methods of preparation and determination of enzyme activities; chemical and physical changes induced in plant tissue by parasites; immunity, etc. Current investigations and new phases of the subjects under discussion will also receive attention as they appear. One hour a week for 24 weeks.

103. BIOLOGIC RELATIONS. — Consideration of certain phases of the morphological and physiological adaptations of plants with regard to insect visit; the rôle of thorns, hairs, tendrils, glands, etc. Various experiments will be made to test out experimentally some of the existing theories concerning biologic adaptations. One lecture a week for 12 weeks.

104. THE ECOLOGY OF PLANTS. — This course deals with the water, light and temperature relations of plants, and the various adaptations in response to these factors; the various types of plant formation; the migration of plants; the competition of plants; invasion and successions of plants under varied conditions; and the various types of alternations and zonations. One lecture a week for 12 weeks.

105. PHYSIOLOGICAL PLANT PATHOLOGY. — This course considers those plant diseases not due to bacterial or fungous parasites, but resulting from unfavorable physical or chemical conditions of the soil; from harmful atmospheric influences, such as too dry air, too much moisture, hail, wind, lightning, frost; from injurious gases and liquids; from lack of or too much light; from wounds. A knowledge of the normal physiology of the plant is required. Demonstrations and laboratory work will be given, together with assigned readings. One lecture a week for 12 weeks.

106. HISTORY OF BOTANY. — A historical survey of the science; lives of noted botanists; history of certain culture plants, such as wheat, corn, coffee, potato, rice, and their influence on civilization; reading. One lecture a week for 18 weeks.

Courses 107 to 112, inclusive, are primarily undergraduate work which may be taken for minor credit toward advanced degrees. Occasionally, in cases of special need, major students are permitted to take specified work in these courses for graduate credit. The maximum number of major credits which may be earned in this way toward the master's degree is 20, and for the doctor's degree, 32.

107. SYSTEMATIC MYCOLOGY. — See undergraduate Courses 52-54.

108. SYSTEMATIC BOTANY OF THE HIGHER PLANTS. — See undergraduate Courses 58, 59.

109. PLANT HISTOLOGY. — See undergraduate Courses 55, 56.

110. CYTOLOGY AND EMBRYOLOGY. — See undergraduate Courses 82, 83.

111. PLANT PATHOLOGY. — See undergraduate Courses 75-77.

112. PLANT PHYSIOLOGY. — See undergraduate Courses 78-80.

113. THE COMPARATIVE ANATOMY OF GREEN PLANTS. — In the lectures an intensive study is directed to the comparative anatomy of green plants from the evolutionary standpoint. Particular emphasis is laid upon the woody forms both living and extinct. Of the latter the department is fortunate in possessing excellent sets of micro-preparations and lantern slides. Two lectures and one laboratory period for 24 weeks. 6 credits.

114. *Seminar*. — A weekly seminar for members of the department staff, graduate students and major senior students is held, at which important current botanical papers are discussed. Attendance and participation are required. 3 credits.

115. *Collateral Reading*. — Extensive reading of botanical literature in English, German and French, designed to give the student a broad knowledge of the science, is required of all major students. Final examinations are based in part upon this reading course. 5 to 10 credits.

116. *Thesis*. — Each major student is required to select a problem in plant pathology or physiology (in other branches at the discretion of the department) for original investigation, and the thesis must embody a distinct contribution to knowledge. An effort will be made to assign problems having some bearing on scientific and economic agriculture. The thesis work counts for not more than 50 per cent of the total number of major credits required for either degree.

Minor Course. — For a minor a student may take such of the work offered by the department as seems best suited to his major course. In most cases no problem will be assigned.

Professors OSMUN, ANDERSON, CLARK, TORREY and —.

Chemistry. — I. Major courses for the degree of master of science. Students will be required to take Courses 101, 108 to 114. In addition to this the requirements in the various thesis subjects are: —

ORGANIC AND BIO-CHEMISTRY. — Courses 115 and either 105, 106 or 107, and 6 hours for one term selected from Courses 103 (b) and (f), and 104.

ANALYTICAL AND INDUSTRIAL AGRICULTURAL CHEMISTRY. — Courses 116, 103 (6 hours), and 6 hours for one term selected from Courses 102, 104 to 107.

PHYSICAL CHEMISTRY. — Courses 104, 117, and 6 hours for one term selected from Courses 102, 103, 105 to 107.

AGRICULTURAL CHEMISTRY. — Courses 103 (6 hours), 118, and 6 hours for one term selected from Courses 102, 104 to 107.

The candidate must pass a final written and oral examination before the Department of Chemistry upon undergraduate Courses 1 to 80, inclusive, and upon all graduate work taken in chemistry by him.

II. Major course for the degree of doctor of philosophy. Students will be required to take Courses 101 to 114, and one course selected from 115 to 118. In addition, the student may be required to spend at least two terms or one semester at some other recognized institution pursuing graduate work in chemistry. The candidate must pass a final written examination before the

Department of Chemistry, and an oral examination before the graduate staff, upon the whole field of chemistry, and must be especially well prepared in the lines of work covered by his research.

III. Minor course for the degrees of master of science and doctor of philosophy. Students will be required to take work totaling at least 25 credits. This may be selected from any of the undergraduate Courses 27 and 51 to 80, or any of the graduate courses for which the student is prepared. In addition, the candidate may be required to pass a final written and oral examination before the Department of Chemistry upon the courses taken and such an examination as may be prescribed upon undergraduate Courses 27 and 51 to 80, or their equivalent.

The following is a list of the courses:—

101. INORGANIC PREPARATIONS. — Laboratory. The preparation of chemical products from raw materials. The manufacture and testing of pure chemicals. The laboratory work is essentially synthetic in nature, and is designed to aid in acquiring a more adequate knowledge of inorganic chemistry than is to be obtained by chemical analysis alone. Ten to fifteen of the preparations given in Biltz's "Laboratory Methods of Inorganic Preparations" will be made by each student. Any term. 3 credits.

Assistant Professor SEREX.

102. ADVANCED INORGANIC PREPARATIONS. — Laboratory. Continuation of Course 101. Any term. 3 credits.

Assistant Professor SEREX.

103. ADVANCED ANALYTICAL CHEMISTRY. — Laboratory. This course may be taken in part as follows: (a) electrolytic analysis, 6 hours; (b) ultimate analysis, 6 hours; (c) special analytical work to meet the needs of the individual student, 6 hours. In addition, parts of undergraduate Courses 62, 76 and 77 may be taken, as follows: (d) fertilizers, 6 hours; (e) insecticides, 6 hours; (f) milk and butter, 6 hours. (a), (b), (c) may be taken any time; (d), (e), (f) must be taken at the time the undergraduate course is given.

Professors WELLINGTON and PETERS.

104. ADVANCED PHYSICAL CHEMISTRY. — Laboratory. Measurement of the electrical conductivity of solutions; degree of ionization; ionization constants; per cent hydrolysis of aniline hydrochloride from conductivity measurements; solubility product by the conductivity method; velocity of saponification by conductivity; neutralization point by conductivity; vapor pressure determinations; critical temperature of carbon dioxide or sulphur dioxide; transport numbers; preparation and properties of colloidal solutions; transition points by dilatometric method; heat of solution of ammonium chloride and potassium nitrate; adsorption of iodine by charcoal; splitting of racemic glycerinic or racemic tartaric acids into their optical components. To each student separate work will be assigned. Any term. 3 credits.

Assistant Professor SEREX.

105. ADVANCED ORGANIC PREPARATIONS. — Laboratory. The preparation of compounds not included in Courses 51 and 52, such as the Kolbe synthesis of salicylic acid; benzophenone and Beckmann's rearrangement;

rosaniline, malachite green, congo red, indigo and other dyes; synthesis of fructose; Grignard reaction. Barnett, Cain and Thorpe, Gatterman, Noyes, Fischer and other laboratory guides are used. To each student separate work will be assigned. Any term. 3 credits.

Professor CHAMBERLAIN.

106. ADVANCED BIO-CHEMISTRY. — Laboratory. The hydrolysis of proteins and isolation of the amino acids; the study of milk, blood and urine; dietary and digestion studies. References: Abderhalden, Plimmer, Sal-kowski, Hawk, etc. To each student separate work will be assigned. Any term. 3 credits.

Professor CHAMBERLAIN.

107. INDUSTRIAL ORGANIC CHEMISTRY. — Laboratory. The preparation, on a large scale, of wood alcohol, acetic acid, ethyl alcohol, benzene and cellulose products, such as mercerized cotton and artificial silk. References: Molinari, Rodgers and Aubert, Thorpe, Enzyklopädie der tech. Chemie, etc. To each student separate work will be assigned. Any term. 3 credits.

Professor CHAMBERLAIN.

108. THEORETICAL CHEMISTRY. — Lectures. The following topics are considered: the compressibility of the atoms; the structure of atoms; the electron conception of valence. First term, 1 hour. Alternates with Course 109.

Professor PETERS.

109. ANALYTICAL CHEMISTRY. — A general survey of methods and technique covering processes commonly carried out in the laboratory. Gooch's Quantitative Analysis is used as a text. First term, 1 hour. Alternates with Course 108.

Professor PETERS.

110. ORGANIC CHEMISTRY. — Lectures. Some of the following topics will be considered both theoretically and industrially: alkaloids, synthetic dyes, essential oils, terpenes, rubber, etc.; the study of methods for carrying out general reactions; isomerism, tautomerism, condensation, etc. References, Cain & Thorpe, Cohen, chemical monographs, Lassar-Cohn, Heinrichs, Molinari. Second term, 1 hour. Alternates with Course 111.

Professor CHAMBERLAIN.

111. BIO-CHEMISTRY. — Lectures. Some of the following topics will be considered both chemically and physiologically: fats, cholesterol, lecithin, carbohydrates, amino acids, proteins, urea, uric acid, purine bases, enzymes, fermentation, animal food and nutrition, photosynthesis. References, Monographs on Bio-Chemistry, Abderhalden, Plimmer, Haas & Hill, Lewkowitsch, Fischer, Euler, Mathews, Czapek. Second term, 1 hour. Alternates with Course 110.

Professor CHAMBERLAIN.

112. THEORETICAL AND PHYSICAL CHEMISTRY. — Lectures. The relation between the constitution and properties of compounds; mutarotation; steric hindrances; stereoisomerism of other elements than carbon; molecular association; similarity between the compounds of silicon and carbon. Third term, 1 hour. Alternates with Course 113.

Assistant Professor SEREX.

113. THEORETICAL AND PHYSICAL CHEMISTRY. — Lectures. Radioactivity; the application of physical chemistry to industrial chemistry. Third term, 1 hour. Alternates with Course 112.

Assistant Professor SEREX.

114. SEMINAR. — Conferences, reports or lectures. Three terms, twice a month, $1\frac{1}{2}$ hours.

Professor LINDSEY.

115. RESEARCH IN ORGANIC AND BIO-CHEMISTRY. — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done.

Professor CHAMBERLAIN.

116. RESEARCH IN ANALYTICAL OR AGRICULTURAL INDUSTRIAL CHEMISTRY. — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by the amount of work done.

Professor WELLINGTON and Professor PETERS.

117. RESEARCH IN PHYSICAL CHEMISTRY. — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done.

Assistant Professor SEREX.

118. RESEARCH IN AGRICULTURAL CHEMISTRY. — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done.

Professor LINDSEY and EXPERIMENT STATION ASSOCIATES.

Entomology. — A. Major courses for the degree of doctor of philosophy. Students must have had the undergraduate courses in entomology given at this college, or their equivalent. If deficient in any, opportunities to obtain them while taking the graduate work are available.

The graduate courses consist of lectures on all, and laboratory work on a part, of the subjects given below, together with advanced readings, seminar work and original research.

I. MORPHOLOGY. — 1. Embryonic development of insects and polyembryony.

2. Metamorphosis and its interpretations.

3. Advanced external and internal anatomy.

4. Insect histology.

5. Ancestry and development of insects, including fossil insects.

6. Hermaphrodites in insects.

7. Hybrids.

8. Parthenogenesis, pedogenesis and heterogeny.

9. Chemistry and physics of insect colors.
10. Color patterns, their significance and value.
11. Luminosity.
12. Deformities.
13. Variation in insects.
- II. ECOLOGY. — 1. Dimorphism and polymorphism.
2. Mimicry, including concealment, protective devices and warning coloration.
3. Architecture of insect structures.
4. Relation of insects to plant fertilization and its importance.
5. Insect products of value to man.
6. Geographical distribution and methods of distribution of insects, with a consideration of life zones, barriers, etc.
7. Insect migrations.
8. Insect behavior and experimental entomology.
- III. ECONOMIC. — 1. Control methods.
2. Insect photography and methods of preparing illustrations.
3. Field work and life history investigations with methods for keeping records.
4. Legislation about insects.
5. Studies of insecticides and their application.
- IV. SYSTEMATIC. — 1. History of entomology.
2. Rules of nomenclature and how they are used.
3. Abundance of insects.
4. Important collections, public and private; their location and their value.
5. Types of insects: their significance, importance and location.
6. Lives and work of prominent entomologists.
7. Methods for collecting, preparing, preserving and shipping insects.
- V. SEMINAR. — Readings and reports on the current literature of entomology; monthly meetings.
- VI. COLLATERAL READINGS. — The best articles on the various topics in entomology are assigned for collateral readings, and are included in the final examinations.
- VII. THESIS. — Original research on one or several topics in morphology, ecology, economic and systematic entomology. This is expected to require from one-half to three-quarters of the total working time of the student. The thesis must give the results of original investigation and be of sufficient merit for publication.
- B. A major course for the master of science degree will be about half of the above.
- C. Minor courses will cover such parts of the work outlined above as will be most likely to prove useful in connection with the majors taken by the students, or in their future work. It is not required that such men shall have had all the undergraduate work in entomology given at this college, their credit for a minor beginning where their own undergraduate training in the subject ended.
- Horticulture.** — Graduate work is offered in various lines of horticulture. For the most part this is divided into the different departments which constitute the college Division of Horticulture, as follows: pomology, floriculture, landscape gardening, forestry and market gardening. For work in these lines application should be made direct to the heads of the several departments.

Besides this work, however, opportunity is offered for graduate study in general horticulture, including topics from the several organized departments mentioned, and also questions relating to plant breeding, general evolution, propagation, manufacture of horticultural products, etc. This general work is under the direction of Professor Waugh, head of the Division of Horticulture.

Landscape Architecture (Major Course). — Every student before receiving his master's degree in landscape architecture must have given some thorough and fruitful study to each of the following five departments. As far as possible these studies must be of a practical nature, *i.e.*, they must be made upon actual projects in progress of development.

1. **THEORY.** — The principles of esthetics as applied to landscape architecture.

2. **DESIGN.** — The principles of pure design and their application in landscape and garden planning.

3. **CONSTRUCTION.** — The practical methods of carrying out landscape plans, laying out, equipment, organization of working force, time and cost keeping, etc.

4. **MAINTENANCE.** — Methods, organization, cost.

5. **PRACTICE.** — Office work, drafting, estimating, reporting, charges, accounting.

Qualifications. — Each student before he may receive the master's degree with a major in this department must convince his instructors that he has a genuine aptitude for some branch of landscape gardening, either in design, construction or management.

The minimum period of graduate study will be one and one-half years. At least one year of this time must be spent in residence at the college, and also one year must be spent in practice outside the college. The work done outside the college may be prescribed by the department, and must be fully reported to the department in writing. It is essential, further, that the candidate secure the written approval of his employers outside the college. The department may, at its discretion, require a longer period of study at the college or a longer apprenticeship outside the college.

Course of Study. — While great freedom is allowed to graduate students in their plans of work, a certain portion of time will always be given to systematic courses of instruction. Those available for graduate students in landscape architecture are as follows: —

175. **THEORY OF LANDSCAPE ART.** — Same as Landscape Gardening 75. First term. 3 credits.

Professor WAUGH.

176. **CIVIC ART.** — Same as Landscape Gardening 76. Second term. 4 credits.

Professor WAUGH.

177. **COUNTRY PLANNING.** — Same as Landscape Gardening 77. Third term. 4 credits.

Professor WAUGH.

178. **ARCHITECTURE.** — Given in alternate years. Same as Landscape Gardening 78. Third term. 3 credits.

Assistant Professor HARRISON.

179. CONSTRUCTION. — Given in alternate years. Same as Landscape Gardening 79. Third term. 3 credits.

Assistant Professor HARRISON.

180. THEORY OF DESIGN. — Same as Landscape Gardening 80. First term. 4 credits.

Professor WAUGH.

181. ESTATE DESIGN. — Same as Landscape Gardening 81. Second term. 4 credits.

Assistant Professor HARRISON.

182. PARK DESIGN. Same as Landscape Gardening 82. Third term. 4 credits.

Assistant Professor HARRISON.

190. THEORY. — Special studies. 2-10 credits.

191. DESIGN. — Individual problems by arrangement. 2-10 credits.

192. CONSTRUCTION. — Individual problems by arrangement. 2-10 credits.

193. MAINTENANCE. — Special studies, experimental work or assigned problems. 2-10 credits.

194. PRACTICE. — Professional field work under supervision. By arrangement. 2-10 credits.

195. THESIS. — By arrangement. 5-20 credits.

Thesis or Project. — Each student before receiving the master's degree with a major in landscape architecture must present a satisfactory thesis or complete project. A thesis will consist of a careful original study of some problem in landscape architecture, presented in typewritten form with any necessary illustrations, such as photographs, diagrams, drawings, etc. A project will consist of a completed set of studies of some suitable landscape-gardening problem, such as the design of a park, a real estate subdivision, an extensive playground. Such a project will usually consist of —

(a) Original surveys, including topography.

(b) Block plans, showing original design.

(c) A rendered plan or plans of the main features.

(d) Detailed working drawings.

(e) Estimates of cost.

(f) Complete report and letter of transmittal.

Minor Course. — Any student electing a minor in landscape architecture will be directed to take such courses from the regular catalogue list as may seem most suitable for him. Under ordinary circumstances no other work will be given to students electing minors. In special cases, however, individual problems will be assigned and individual instruction given. These exceptions will be made in cases where, by so doing, it is possible to give the student material assistance in the plan of his major work.

Prerequisite Work. — The undergraduate courses in the college known as Landscape Gardening 50, 51, 52 and 53, Drawing 25, 26, 27, Horticulture 27, 50, 51, and Mathematics 26 and 27 will be considered prerequisite to graduate work, and any student not having passed these courses or their equivalent will be required to make up such work without graduate credit. Courses known as Landscape Gardening 75, 76, 77, 78 and 79 are required and may or may not be accepted for graduate credit, at the discretion of the department.

Microbiology. — I. COURSES LEADING TO THE DEGREE OF DOCTOR OF PHILOSOPHY. — 1. The candidate must present 25 credits from the undergraduate study as furnished in undergraduate Courses 50, 51, 52, 80, 81, 82 and 83, or an equivalent, before he can enter upon graduate study.

Note. — Twenty-five credits are required of undergraduates majoring in microbiology.

2. The candidate must pursue successfully the following special courses, or their equivalent. These courses are designed to give a comprehensive survey of the fields indicated, and are arranged especially for graduate students.

175. Agricultural Microbiology,	. . . . .	5-10 credits.
176. Agricultural Microbiology,	. . . . .	5-10 credits.
180. Soil Microbiology, .	. . . . .	5-10 credits.
181. Hygienic Microbiology, .	. . . . .	5-10 credits.
182. Dairy Microbiology,	. . . . .	5-10 credits.
183. Food Microbiology,	. . . . .	5-10 credits.

Note. — Courses 175, 176, 180, 181, 182 and 183 correspond in subject-matter with Courses 75, 76, 80, 81, 82 and 83 of undergraduate study; the latter courses are elementary in nature, while the former are arranged for intensive advanced study of graduate character. Candidates will be required not only to perform the exercises of the above courses, but will be expected to report on prescribed readings and to assist in teaching the elementary classes covering the same theme as a part of graduate requirements.

3. It will be necessary to complete additionally the following courses, or their equivalent, open only to graduate students:—

150. I, II, III. LECTURES AND STUDY OF LITERATURE. — Continues over three years, once each week. 1-5 credits each term.

Professors MARSHALL and ITANO, and Mr. AVERY.

151. CYTOLOGICAL AND MORPHOLOGICAL STUDIES AND TECHNIQUE. — Given every third year. 5-10 credits.

Professors MARSHALL and ITANO, and Mr. AVERY.

152. PHYSIOLOGICAL STUDIES. — Given every third year. 5-20 credits.

Assistant Professor ITANO.

160. STUDIES IN TECHNIQUE, AS PHOTOMICROGRAPHY, LABORATORY EQUIPMENT AND MANIPULATION. — Given every third year. 5-10 credits.

Assistant Professor ITANO.

161. INDUSTRIAL FERMENTATIONS. — 5-20 credits.

Professors MARSHALL and ITANO, and Mr. AVERY.

177. MICROBIAL STUDIES IN AGRICULTURE. — Specific subjects. Given every third year. 5-10 credits.

Professors MARSHALL and ITANO.

181A. SPECIAL SANITARY OR HYGIENIC STUDIES. — Given every third year. 5-10 credits.

Professors MARSHALL and ITANO, and Mr. AVERY.

200. RESEARCH. — Some microbiological problem related to agriculture or food. Distributed as may be most beneficial for research work. Time and credit by arrangement. 40-50 credits.

Professors MARSHALL and ITANO, and Mr. Avery.

The thesis prepared must be satisfactory to the department and the graduate staff, and the candidate must be ready to defend it at his public examination. Further, following the presentation of the thesis, the candidate must submit to a written examination covering the entire subject by the department and a public oral examination under the auspices of the graduate staff.

II. COURSES LEADING TO THE DEGREE OF MASTER OF SCIENCE. — 1. Prerequisite studies, as in the case of the degree of doctor of philosophy (I, 1).

2. Special studies as represented by courses —

175. Agricultural Microbiology,	. . . . .	5-10 credits.
176. Agricultural Microbiology,	. . . . .	5-10 credits.
180. Soil Microbiology, .	. . . . .	5-10 credits.
181. Hygienic Microbiology, .	. . . . .	5-10 credits.
182. Dairy Microbiology, .	. . . . .	5-10 credits.
183. Food Microbiology, .	. . . . .	5-10 credits.

3. Courses designed for graduate students only: —

150. I, II, III. Lectures and Study of Literature.

5 credits. Professor MARSHALL, Assistant Professor ITANO and Mr. AVERY.

200. I, II, III. Research. (Some microbiological problem related to agriculture.)

15-25 credits. Professor MARSHALL, Assistant Professor ITANO and Mr. AVERY.

The thesis submitted must be satisfactory to the department and to the graduate staff.

The candidate will be required to take a written examination and an oral examination by the department.

III. MINOR WORK IN MICROBIOLOGY. — May consist of Undergraduate Courses 50, 51, 52, and two other courses, designed to support the major work, from among Courses 175, 176, 180, 181, 182, 183. He will also be required to pursue Graduate Course 150 through three terms (see II, 3, 150). In case the candidate has had some of these courses he will be required to take more advanced substitute courses. A written examination over the subject-matter covered will be given at the close of the work of each course.

Poultry Science (Major Course for the Degrees of M.Sc. and M.Agr.). —

101. READING. — A review of the entire field of poultry literature, covering books, bulletins and special articles, is made, and a written report on one or more subjects required.

110. SEMINAR. — A critical review and a criticism of the more important experiments carried on at the various stations in this and other countries; also a study of poultry conditions in foreign countries, methods of management, etc., besides a detailed study of some of the largest poultry projects in this country.

120. ANATOMY (GROSS AND HISTOLOGICAL), PHYSIOLOGY AND SURGERY. — This course requires a careful study of the anatomy and physiology of the fowl. Special attention is given to a study of those structures concerned with practical poultry problems. Instruction in surgical technique, adapted to fowls, may also be given.

130. BREEDING. — The student will carry on such breeding experiments as time and facilities permit. He may also do work in connection with our regular experimental projects. A detailed study of the pertinent literature will be required. Animal Husbandry 5, or its equivalent, is a prerequisite.

140. FEEDING. — A study of the relation of various foods and other substances to the morphology and physiology of the bird, with special reference

to such subjects as egg production, feather form and structure, condition of flesh, bone, etc.

150. **BROODING.** — Studies will be made upon the relation between viability and rate of growth and the following topics: type of brooder, number of chicks in brood, ventilation, humidity, sanitation, exercise and weather conditions; also a comparison of natural methods with artificial methods of rearing chicks.

160. **INCUBATION AND EMBRYOLOGY.** — A number of problems of a practical, scientific and mechanical nature relating to incubation are considered. The work in embryology is of an advanced nature dealing with its relation to morphogenesis and heredity, and presupposes an elementary knowledge of the embryology of the chick.

170. **POULTRY DISEASES AND SANITATION.** — In this course a study is made of various problems in poultry sanitation, with particular reference to methods relating to the control and eradication of disease.

200. **THESIS.** — A thesis based on first-hand work on some problem in poultry biology or husbandry is required of all students working for the M. S. degree, and may be required of those working for the M. Agr. degree.

Note 1. — The postgraduate course presupposes all undergraduate work or its equivalent, together with practical experience. Without the latter, students will be unable to handle Courses 5, 6 and 7. At the discretion of the instructor in charge, graduate students may be required to pursue undergraduate courses in other departments without credit.

Note 2. — Practical poultry work may be required, but no credit will be given for such work.

Note 3. — Courses 1 and 2 are designed particularly for minors.

Rural Sociology. — I. *Courses leading to the Degree of Doctor of Philosophy in Rural Sociology.* — Candidates for the degree of doctor of philosophy must present satisfactory evidence of having completed at least twenty hours' credit in general sociology and general and agricultural economics. In the event that they are unable to present such evidence, they will be required to take these courses without credit before entering upon the work for the degree. Candidates must pass an examination in all courses offered by the department, primarily for undergraduates, and, in addition, to pursue in a satisfactory manner Courses 182, 183, 184, 185, 186 and 187. These courses are arranged for graduate study of an intensive character. Candidates for the degree must select one of the divisions of the subject, as indicated below, for intensive study and research. A thesis showing the results of personal original investigation in the selected field of research must be presented. This thesis must show familiarity with the material bearing on the subject, ability in discovering and utilizing original sources, judgment in evaluating facts, evidences and authorities, originality and independence of thought. The thesis must be a very definite contribution to rural sociological thought. It must meet the requirements of the department and of the graduate staff. The candidates will be required to defend the theses at public examinations held by the graduate staff. A written examination covering the whole subject, conducted by the department, and a public oral examination by the graduate staff will be required.

II. *Courses leading to the Degree of Master of Science.* — The candidate must present satisfactory evidence of having completed twenty-five hours in general sociology and general and agricultural economics. If he is not able to offer satisfactory credit, such courses must be taken as the department may

require. A candidate for the degree of master of science must pass examinations in all courses designed primarily for undergraduates. For his graduate work he must select one or more, as required by the department, of the divisions of the subjects as shown below for intensive study and research. A written and oral examination is required. A thesis satisfactory to the department and to the graduate staff must be presented.

III. *Minor Work in Rural Sociology.* — Minor work in rural sociology shall consist of such graduate and undergraduate courses as the department may require, subject to the regulations of the graduate school. A written examination covering all courses taken will be held by the department. Research topics as numbered below are indicated as fields of study for higher degrees. They presuppose such undergraduate courses, or their equivalent, as correspond to the courses of similar numbers in figures with the 100 omitted.

TOPICS FOR STUDY AND RESEARCH.

182. Social conditions of American rural life: —

- (a) The status of country people in relation to health, education, morality, general welfare, etc.
- (b) Origin and development of rural ideals.
- (c) Influence of modern conditions on rural life.
- (d) Historical development of the community, and problems and methods in community organization.

183. Rural institutions: —

- (a) The family and rural life. An intensive study of the development of family customs and ideals; their relation to religious, educational and social agencies. The relation of the standard of living to rural social progress. The social aspects of the scope, functions and influence of educational institutions in relation to rural progress.
- (b) The growth, development and problems of the country church.
- (c) The status of the rural school.

184. Rural organization.

- (a) The scope and function of rural organization in development of rural life.
- (b) Work of the national government in rural organization.
- (c) County and institutional work in rural organization.
- (d) Leadership in its relation to organization.

185. Rural government and rural law.

- (a) Development of rural local government in New England and the west. Progress in efficient local self-government.
- (b) Relation of the State to the farmer; influence of the farmer in legislation; the organized ways and means by which the State aids the farmer directly.
- (c) Work of the national government in its relation to the social welfare of the farming people.
- (d) Agrarian legislation in the United States and Europe affecting rural social welfare.

186. Farmers' organizations.

- (a) Social problems underlying farmers' organizations in reference to service and permanency.
- (b) Principles of organization.
- (c) History of farmers' organizations in the United States.

187. Rural sociological surveys, an intensive study of the method of evaluating social statistics.

188. Thesis.

Veterinary Science. — Work is available in anatomy, hygiene, veterinary pathology, medicine, surgery, parasitology and other special lines or divisions of the subject.

Zoölogy. — Courses in zoölogy may be available as a minor for the degree of master of science and as a minor for the degree of doctor of philosophy. The nature of the work will necessarily vary according to circumstances, and may

be intensive in a special field and correlated closely with the major work of the student, or it may be of a more general character, depending on the student's needs or previous acquaintance with general zoölogical science. The completion of work equivalent to at least 25 undergraduate credits will be required for a minor pursued in zoölogy for either of the above-named degrees.

LIST OF STUDENTS.

A list of the degrees conferred in the Graduate School, and of the students enrolled, is given in the general lists at the end of the volume.

THE SHORT COURSES

THE SHORT COURSES.

The short courses offered by the Massachusetts Agricultural College are designed to meet the needs of those, both young and old, who cannot come to the college for the regular college courses. They furnish the student with instruction in modern accepted methods, and are planned to help the farmer and the housewife.

The short courses include:—

- A. The Two-year Course in Practical Agriculture.
- B. The Ten Weeks' Winter School.
- C. The Summer School.
- D. The Vocational Poultry Course.
- E. Unit Courses for Ex-service Men.

REQUIREMENTS FOR ADMISSION TO SHORT COURSES. — Students must be at least seventeen years of age, and must furnish satisfactory evidence of good moral character. References are required. There are no entrance examinations. The sole test is ability to do the prescribed work. Students enrolling for the Two-year Course in Practical Agriculture must have at least a common school education.

EXPENSES OF SHORT COURSES. — The expense of attending any of the short courses is approximately as follows:—

Furnished rooms in private houses (per week),	\$3 to \$5
Board at college dining hall (per week),	\$7
Board with private families (per week),	\$6.50 to \$9
Registration fee (Ten Weeks' Winter School),	\$5

Tuition in all the short courses is free to residents of the Commonwealth. Small laboratory fees are charged in some of the courses.

A. TWO-YEAR COURSE IN PRACTICAL AGRICULTURE.

The Two-year Course in Practical Agriculture is offered to meet the needs of students who for one reason or another cannot take the four-year college course. It is designed to provide the largest amount of practical information and training in agriculture and horticulture, general farming, etc.

It will appeal, not only to young men and women, but also to men and women of mature years and practical experience who wish to know more about the business of farming. Although the course is planned to meet the needs of those who are not graduates of high schools, the instruction is not preparatory or elementary in its nature, but is so planned that it will be of value to all. The greater amount of academic training that some of the students may possess will in a measure be offset by the fund of practical knowledge possessed by many who have completed only the elementary schools.

The course is not intended for students enrolled in high schools. Such students should finish the high school course. Students enrolled in high schools who wish to take the course should bring a statement either from the principal of the high school or from parent or guardian asking permission to be enrolled.

The Two-year Course in Practical Agriculture is arranged so as to provide specific vocational training for the particular lines of agricultural work which the students may select. When a student enrolls he is required to state the type of farming in which he expects to engage; and to select from the following courses of study the one he wishes to pursue:—

1. General agriculture, with animal husbandry as the principal subject.
2. General agriculture, with poultry as the principal subject.
3. Dairy manufactures.
4. General horticulture.
5. Pomology.
6. Floriculture.
7. Vegetable gardening.

He then pursues a specially arranged course of preparation for that type of work. This specialization does not prevent his securing a general working knowledge of other subjects in which he may be interested.

The advantages of the college staff of specialists and the college plant with all its resources are thus made available to young men and young women who may not have had the opportunity of securing a high school education.

The first year consists of six months of study at the college. The term begins with the college fall term and closes with the winter term of the regular session. The same vacation periods are observed as in the regular four-year course.

At the close of six months of study, students are required to gain six months of farm experience. The college will assist students in finding positions and in placing them on farms where the experience gained will be of great advantage. Thus an effort will be made to place on a dairy farm the man expecting to take up dairying as his chief line of work, and a student of pomology on a fruit farm.

During the second year the student spends nine months in resident study, completing the subject pursued in the first year.

Each student is required to file with the treasurer of the college a statement, signed by the town (or city) clerk of the town (or city) from which he enrolls, stating that the parent or guardian of the student is a resident of that town.

CERTIFICATE.—All students will receive a certificate showing their standings in courses in which they were registered. Credits earned in the Two-year Course in Practical Agriculture or in any other of the short courses do not lead to the college degree. Students who possess college entrance requirements and who wish to take the regular college work should address the registrar of the college.

B. THE WINTER SCHOOL.

The Winter School, beginning usually about January 1 and continuing for ten weeks, was started several years ago, and has always been very popular, not only with more mature farmers and their wives, but with young men and women who control or manage farms. The courses, though short, are very practical in their nature, and are so arranged that a student may choose

such subjects as will enable him to specialize along the line of work in which he is most interested. There is a wide range in the choice of subjects, making it possible for the student to take work for several winters in succession. Many college graduates enroll for the Winter School.

SCHOLARSHIPS. — The Jewish Agricultural and Industrial Aid Society of New York has instituted a system of free scholarships to enable the children of Jewish farmers to attend the short winter course in the States in which they reside. The stipend is sufficient to pay all the expenses of the holder for the course. Such expenses usually amount to from \$100 to \$150. The following courses are offered: —

OUTLINE OF THE TEN WEEKS' WINTER SCHOOL, JANUARY 2 TO MARCH 10.

- Soil Fertility. Professor BEAUMONT. Three lectures a week.
- Field Crops. Two lectures and one two-hour laboratory period per week.
- Types and Breeds of Livestock. Three lectures and two two-hour laboratory periods a week.
- Livestock Feeding. Three lectures per week.
- Animal Breeding. One lecture and one two-hour laboratory period per week.
- Dairying. Professor LOCKWOOD and assistants. Five lectures and five laboratory periods per week.
- Dairy Bacteriology. Professor MARSHALL. Two lectures and one two-hour laboratory period per week.
- Animal Diseases and Stable Sanitation. Assistant Professor LENTZ. Two lectures per week.
- Poultry Husbandry. Five lectures and one two-hour laboratory period per week.
- Fruit Growing. Professor SEARS. Three lectures and one two-hour laboratory period per week.
- Market Gardening. Mr. HARRIS. Three lectures and two two-hour laboratory periods per week.
- Floriculture. Professor THAYER and Mr. MULLER. Five lectures per week.
- Horticultural Manufactures. Professor CHENOWETH. Two lectures and two laboratory periods per week.
- Farm Management. Assistant Professor ABELL. Two lectures a week.
- Farm Accounts. Assistant Professor ABELL. Two two-hour laboratory periods per week.
- Marketing. Professor CANCE and assistants. Two lectures a week.
- Agricultural Credit. Professor CANCE and assistants. Two lectures a week.
- Botany. Assistant Professor McLAUGHLIN. Two lectures a week.
- Entomology. Assistant Professor REGAN. Three lectures per week.
- Farm Structures. Assistant Professor STRAHAN. Two lectures and one two-hour laboratory period per week.
- Farm Machinery. Professor GUNNESS. Two lectures and three two-hour laboratory periods a week.
- Rural Sanitary Science and Hygiene. Professor MARSHALL. Two lectures per week.
- Vocational Guidance. Miss HAMLIN. One lecture per week.
- Foods. Miss SKINNER. One lecture and two two-hour laboratory periods per week.
- The Business of the Household. Miss SKINNER. Three class hours per week.
- Home Care of the Sick. Miss SKINNER. Three class hours per week.
- Principles and Methods of Vocational Agricultural Teaching. Professor HART. Five exercises per week.
- Special Methods in Vocational Agricultural Teaching. Professor WELLES. Five exercises per week.
- Professional Improvement Problems. Mr. HEALD. Five periods per week.

C. THE SUMMER SCHOOL.

In 1919 a plan of co-operation between the Massachusetts Agricultural College and the Division of Elementary and Normal Schools of the State Department of Education was begun. Twenty-five courses were offered in agriculture and horticulture, and nineteen courses in education.

The plan was so satisfactory that it was continued in the summers of 1920 and 1921. More courses in agriculture, horticulture and education were offered. Three hundred students were enrolled.

The following subjects were offered: —

Agriculture: —

Soil fertility.
Manures and fertilizers.
Types and breeds.
Feeding and management.
Dairying.
Poultry.
Farm management.
Farm accounts.
Farm machinery and gas engines.
Repair of farm equipment.

Horticulture: —

Garden flowers.
Indoor flower growing.
Food preservation I.
Food preservation II (two weeks).
Fruit growing.
Vegetable gardening.

Home life and practical arts: —

Foods.
Elementary dietetics.
Clothing I.
Clothing II (advanced).
Business of the household.

Education: —

Primary language.
Primary reading.
Arithmetic I (primary).
Arithmetic II (intermediate).
Method of teaching history in grammar grades.
Training in the duties of citizenship.
Methods in elementary schools.
Methods in English for the intermediate and grammar grades.
Design and practical arts.
Oral English and parliamentary practice.
Organized play and recreation.

Related subjects: —

Insect life.
Hygiene and sanitation.
Marketing agricultural products.
Plant diseases.
Rural sociology.
Agricultural opportunities for women.

Vocational agricultural teaching: —

Principles and methods of teaching.
Special methods in vocational agricultural teaching.
Professional improvement problems.

The Two-year Course was continued for a nine weeks' term during the summer, from June 27 to August 27, to accommodate ex-service men in training under the Division of Rehabilitation of the Federal Board for Vocational Education.

D. ONE-YEAR VOCATIONAL COURSE IN POULTRY HUSBANDRY.

PURPOSE. — This course is designed for graduates of the agricultural vocational schools and others who wish to prepare themselves for practical poultry keeping, and can spend only one year at college.

SCOPE. — The work covers seven detailed courses in poultry husbandry, as well as short-course work in fruit growing, market gardening, animal husbandry, or other subjects that will be helpful to poultry raisers. In addition to classroom and laboratory exercises each student is required to put in from twenty-five to thirty hours per week at the plant in the care and management of poultry, for the purpose of becoming proficient in the various branches of the work.

ENTRANCE REQUIREMENTS. — Applicants must be at least eighteen years of age and have a good elementary education.

FEES. — There is no tuition for residents of Massachusetts, but a laboratory fee of \$5 is required for both the fall and spring terms.

NOTE. — The course is limited to sixteen students. The One-year Poultry Course begins in December and continues until the following December.

Due to a strong demand for the course, it was necessary to start a second class in vocational poultry at the beginning of the winter term. Thirty students were enrolled in both classes of vocational poultry.

E. UNIT COURSES FOR EX-SERVICE MEN.

The agricultural Unit Courses were organized to provide instruction for men disabled in the military or naval service of the United States, who were unable on account of limited education to enter the Two-year Course.

A student enters the agricultural Unit Courses if his previous education is not sufficient to permit of his taking up the work of the Two-year Course. The Unit Courses begin every month in the year except September. Each man may select, in addition to the English and mathematics that are required, two or three lines of work to which he will expect to devote most of his time.

In connection with the Unit Courses there is much actual practice on the farms, orchards, gardens, in the dairies, barns, shops and greenhouses, and with poultry, live stock and farm machinery. These courses are limited to students sent by the Federal Board for Vocational Education.

The following subjects are offered: —

Agronomy.	Fruit growing.
Animal husbandry.	Vegetable gardening.
Dairying.	Poultry.
General horticulture.	Farm mechanics.
English.	Floriculture.
Arithmetic.	General horticulture.

COUNTRY MINISTERS' COURSE.

A school for country ministers was conducted from May 2 to 13, 1921, with a series of lectures on the following subjects: —

Rural organization.	Soil fertility.
Agricultural economics.	Animal husbandry.
Community recreation.	Poultry.
Gas engines.	Fruit growing.
Vegetable gardening.	Farm management.
Food preservation.	Floriculture.

The purpose of this school was to acquaint the ministers in rural communities with some of the problems of agriculture. This school was followed by a conference of two days on the enlistment and training of rural religious workers.

THE EXTENSION SERVICE

THE EXTENSION SERVICE.

The Extension Service is the organized effort of the whole Massachusetts Agricultural College in educational service to the citizens of the Commonwealth who cannot enter as resident students. Its task is to make available all the useful and practical information discovered by the efforts of the Experiment Station, reinforced by the United States Department of Agriculture and the experiment stations of other States. The Smith Lever Act defines extension work as "the giving of instruction and practical demonstrations in agriculture and home economics to persons not attending or resident in colleges — and imparting to such persons information on said subjects through field demonstrations, publications and otherwise."

The Extension Service is a recognized part of the college organization, with a staff giving full time to extension work; yet the actual working force is much larger because many of the resident faculty and research staff give time to extension work, the specialists of the United States Department of Agriculture are frequently in the State on special problems, and the staffs of the County Extension Services, who co-operate as local representatives in the extension organization, are in direct and constant touch with the problems and the people of the State.

It is impossible to discuss the Extension Service without including these co-operating agencies, — the United States Department of Agriculture and County Extension Services. While the extension staff at the college receives its major support from the State Legislature, Federal funds are received through the Department of Agriculture, and are used, according to act of Congress, in the support of work both at the college and in the counties. In addition to these funds the County Extension Services, which are supervised by the Trustees for County Aid to Agriculture, receive from county and town appropriations still larger amounts, all of which must be applied to extension work.

PERSONNEL.

COLLEGE EXTENSION STAFF. — Extension work at the college is organized with a director in charge, and under him three State leaders who are joint employees of the State and Federal government. The State leaders are in charge of county agent work, home demonstration work and junior extension work, respectively. Extension specialists are employed in the following subject-matter fields: agronomy, animal husbandry, poultry husbandry, pomology, horticultural manufactures, marketing, farm management, clothing efficiency and nutrition. In addition, the Extension Service employs an assistant director who is a specialist in methods of extension instruction and in office and field organization; a supervising specialist in charge of extension schools, agricultural exhibits and extension courses at the college; and an extension editor who is also supervisor of correspondence courses. The State leader of

junior extension work also has three assistants, each in charge of specialized subject-matter branches.

COUNTY EXTENSION STAFFS. — In each county in the State, with the exception of Suffolk, Dukes and Nantucket, a staff of extension agents is maintained. In eight of the counties these agents are employed by a Board of Trustees for County Aid to Agriculture, and in three counties by the Trustees for the County Agricultural School of the County. In each of these eleven counties are a county agricultural agent, a county home demonstration agent and a county club agent. These are joint employees of the county, the college and the United States Department of Agriculture. Their major responsibility is to their county trustees, yet on the basis of co-operative projects they are a very important part of the total extension staff of the State. In addition to these three agents co-operatively employed in each county, there are in many of the counties assistant agents.

Because of the co-operative relation with the Federal government, it is possible to secure much assistance from the Department of Agriculture in Washington. Subject-matter specialists are employed by the States Relation Service in the major branches of agriculture and home-making. In addition, the research facilities of the Department of Agriculture, the Division of Publications, the Bureau of Markets, and many other sub-offices within the Department are constantly furnishing help in solving problems in the State, and frequently Federal staff members assist the staff members of either college or county with particular problems.

CO-OPERATION OF AGENTS. — In the extension program as now being carried out the Department of Agriculture furnishes a certain amount of finance and a great deal of supporting information resulting from the research work of the experiment stations, this being by conference with the extension specialists of the State and county, and not as a direct service to the people of the Commonwealth. It is the function of the extension specialist at the college to be what the name implies, — to be constantly up to the minute in the subject-matter of his specialty, organizing information and preparing it in proper form for the use of the county agricultural agents; to head up the development program in his subject-matter in the entire State, and thus furnish a correlation between the Department of Agriculture and its research work, the forces of the teaching and experimental faculty at the college, and the county agents who are in immediate contact with the people of the State. It is obvious that no county agent can be a specialist in all branches, and that all the county agents will need the specialist's support in many branches. The specialist has now become much less a direct teacher of farmers and homemakers, and much more a consultant and adviser with the county agents on the problems which are too deep or too intricate for solution by them. The county agents in agriculture, home economics and junior club work are at present making the real contacts with the people of the State; they study the problems at first hand, and organize the demonstrational programs. It should be noted that they are part of a national staff, over 2,000 counties in the United States employing county agricultural agents, all of whom are related in a single movement to the United States Department of Agriculture, 800 home demonstration agents and 300 junior club agents. Thus it will be seen that the extension staff from the Department of Agriculture in Washington, and including the remotest experiment station on the Pacific coast, is organized to avoid duplication of function. The tasks of each group are quite distinct.

PROJECTS AND PROGRAMS. — Because it is impossible for a staff of limited number to meet personally all the farmers and home-makers of the State relative to problems, it has been necessary to devise a system of education which would make available in the most positive form to the greatest number of people such information as it seems desirable to impart. The demonstrational methods are the ones finally accepted as most effective. Demonstrations of the best practices in agriculture and home-making are maintained by the co-operation of farmers and home-makers throughout the Commonwealth, from the tip of Cape Cod to the westernmost Berkshires. The co-operators undertake to do certain operations or conduct certain enterprises according to the approved method and in co-operation with the agents. The results of their efforts are used as a basis of teaching. Where the method is one with visible results, as in the comparison of seed potatoes or in spray control of orchard pests, the attention of farmers and home-makers in the vicinity of the demonstration is directed to it, and frequent conferences and meetings are held in order that the approved method may be understood. The time of the county agent is therefore primarily spent with the co-operating farmers and home-makers, who are known as demonstrators. A great amount of personal service is also undertaken in the form of conferences, consultations, advice and correspondence, etc. This, however, must give place to the systematic demonstrational work which endeavors to stress the most important subjects in the various branches of agriculture and home-making. In this demonstrational program the specialists work out the basis of the demonstrations, provide the informational material, and supervise the method of carrying out in regard to data and analysis of results, and the county agents arrange with the demonstrators and give personal attention to the demonstrations themselves.

PROJECTS AND PLANS OF WORK.

In order that this work may be definite it is organized on a project basis. The agronomy project, for instance, defines the needed practices or changes in practices with regard to soil fertility and crops. The most fundamental things are selected as a basis of intensive work, and each year a program of work is written jointly by the specialists and county agents defining the particular steps in the long-term program which are to be carried forward during the year. The communities of the State decide which of the various projects, and which phases of these projects, are most important in their communities, and arrange co-operation with the county agents and specialists.

It will be noted from the foregoing that the work is organized in three major lines, — agriculture, home-making and junior extension. The first two are divisions in subject-matter; the third utilizes the same subject-matter as the projects in agriculture and home economics, but adapts it to the needs of young people. It is built on the principle that boys and girls and young men and women can receive and give great benefits if they will elect productive tasks and follow them systematically. The junior clubs, so called, are built on the basis that there are many productive and interesting and worth-while tasks in agriculture and home economics. It is the task of the junior extension agent to adapt adult material to the needs of this younger clientele.

TYPES OF WORK.

DEMONSTRATIONS. — Demonstration work is of primary importance in the extension program. Demonstrations may be of various types: demonstrations of practice, as illustrated by a system of crop rotations; a demonstration of operation, as in grafting, spraying, poultry killing and culling, etc.; and comparative demonstrations, as between native and northern-grown seed potatoes, top-dressed and neglected hay land.

EXTENSION SCHOOLS. — Through the winter months the Extension Service arranges schools of one to five days' duration, which are held in various communities. At all of these schools intensive attention is given to certain selected subject-matter. The tendency of the past two seasons has been toward the one or two subject school rather than the general extension school of the past. The teaching is usually divided between the county staff, specialists from the college and co-operating demonstrators who have got notable results in agriculture and home-making.

FAIR EXHIBITS. — The college has undertaken many types of enterprise in the field of fair exhibits. At present, lack of funds will prevent any great effort in the way of transporting material exhibits. Much is being done by the County Extension Services, supported by the assistance of the college specialists, in the way of demonstrational exhibits at fairs. This type of exhibit seems to promise large development. It is hoped, also, that physical arrangement may be made whereby the college live stock can be exhibited more freely. At present this is impossible, owing to the fact that funds are not available, and premiums earned or won by the live stock must revert to the State treasury, and are therefore unavailable for defraying the expenses of such exhibits.

CONFERENCES AT THE COLLEGE. — All conferences at Amherst of two weeks' duration or less are considered extension activities. The largest of these is the summer Farmers' Week coming during the last week in July, and built upon the principles of demonstration meetings at various advantageous places on the farm, utilizing the physical equipment of the orchards, the fields and the barns as a conferential basis. In addition to this, meetings of many organizations are held at the college, as in the case of the sheep breeders, the fruit growers, the onion growers, the poultry growers, etc. Many of these are held in connection with the summer Farmers' Week, but it is advantageous to hold others during the winter time according to the needs of a particular group. It is also the policy of the Extension Service to bring to the college, not only the county staff for annual and other conferences, but to bring in the men and women of the State who are co-operating and leading, in order that they may have special training in the subject-matter of their efforts.

CORRESPONDENCE COURSES. — The Extension Service maintains a correspondence course division, and offers correspondence courses at a fee of \$2 in the following subjects: soils, manures and fertilizers, field crops, feeding farm animals, fruit growing, — which is divided into three parts, comprising apple growing, peach and plum culture, and small fruits, — vegetable gardening, floriculture, farm accounts, farm management, entomology, plant pathology, forestry, shade tree management, poultry husbandry, — which is divided into three parts, poultry house construction, management of the flock, and incubation, — and home economics.

PUBLICATIONS. — The work of the Extension Service is supported by exten-

sion publications which are prepared with the intent to meet the needs of the people of the State for concise practical information. It is not the function of the Extension Service to provide voluminous textbooks free, but rather, manuals of practice and of information which will give in the most concise and usable form the instructions necessary to the practices of agriculture and home-making. The entire literature of the Extension Service is being revised to this basis, the Extension Leaflets being small units reduced to the simplest terms and the smallest compass, telling a complete story. The series of leaflets in a subject-matter division make a larger bulletin, and the collection of all the leaflets will ultimately make a manual of practice for the average farmer or home-maker of the State. About 1,200,000 pages were printed last year. All the publications of the Extension Service are free. In addition to this it is the practice of the Extension Service to keep a large stock of publications of other colleges, experiment stations, and of the United States Department of Agriculture. These also are distributed free. Stocks of these publications are kept in the offices of the county agents, and can be obtained by application to them. Outside of these publications the Extension Service publishes monthly two small periodicals. "The Monthly Report of Extension Work for Market Gardeners" is a small pamphlet similar to the Extension Leaflets, and the "Extension Service News" is in the form of a small newspaper. These also may be had for the asking.

LECTURES. — During the course of the year a great deal of lecture work is done by the county agents and the specialists of the college. This service seems to be of diminishing value except in cases where it leads to permanent demonstration work. It is the aim of the college to meet all calls for lectures just as far as the time of the staff will allow, first of all giving preference to the demonstrational type of work. Very few calls for lectures have been left unmet during the past year.

PERSONAL ADVICE. — The staffs in the counties and in the college do much in the way of answering individual queries, either personal or written. This work establishes many valuable contacts, and the college undertakes to perform just as much of it as is possible. However, much of this inquiry is diverted to the offices of the county extension services, the college handling only such phases of the work as cannot be handled in the counties.

LIBRARY EXTENSION WORK. — The college library has collections of books on specified subject-matter fields, and furnishes these free of charge to the libraries of the State as loan collections. An increasing amount of this work is being done.

DIAGNOSIS AND PRESCRIPTION. — Calls are constantly coming to the college for information which is really diagnosis. Bushels of malodorous hens, bugs of all description, diseased leaves, and fruit are constantly being received. Just as far as the college is able, the trouble is identified and remedial measures suggested. Here, again, the burden is greater than the college is able to bear at the present time with limited staff, and it is further the conviction that service which can be rendered by a professional veterinarian should be rendered by him. Every effort will be made to take care of such requests for such service as cannot be met by a professional veterinarian, although no guarantees can be given that adequate help will be available for this work.

ASSISTANCE TO STATE INSTITUTIONS. — Managers of State institution farms are constantly asking information of one sort or another from the col-

lege, and the specialists are co-operating in many problems of agriculture and landscape gardening.

LIAISON ACTIVITIES. — No small part of the work of the Extension Service, particularly the county staffs, is in bringing other agencies to the assistance of the people of the State. Those desiring systematic study are brought in touch with the vocational schools or practical arts classes in case they are unable to come to the college. Communities desiring assistance in health problems are brought in contact with some of the health agencies in the Commonwealth and voluntary health societies, such as the Red Cross, the county public health associations, etc. It is not the function of the Extension Service in any sense to replace these agencies or to compete with them; rather, to divert to them such calls for help as they are able to meet.

REAL EXTENSION. — The real extension work is done, not only by the staff, but by the best farmers and best home-makers of the State who demonstrate the best practices. The Extension Service cannot be considered without considering these co-operating demonstrators. Those who receive instruction in household management, clothing efficiency, nutrition, agronomy, pomology, poultry husbandry, etc., are the real instructors in their neighborhoods. It is the task of the Extension Service to teach the best farmers and home-makers to perfect their teaching technique, and to depend upon them for the general spread of the practice throughout the State.

Requests for information in any of these fields may be addressed to the Extension Service, Massachusetts Agricultural College, Amherst, Mass.

GENERAL INFORMATION

GENERAL INFORMATION.

A. FINANCIAL AND ADMINISTRATIVE.

Student Expenses.

TUITION.¹— Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of \$60 a year. The tuition charged persons not citizens of the United States is \$120 a year. Students entering from Massachusetts are required to file with the president a statement signed by either town or city clerk stating that the applicant's father is a legal resident of Massachusetts; a similar statement is required of those entering from other States.

All students entering the college for the first time as undergraduates or two-year students are charged a matriculation fee of \$5, which in event of a student leaving the institution shall, if all bills due the college are paid, be remitted, or which shall upon graduation be considered as payment for the diploma.

DORMITORIES AND BOARD.— The college has dormitory accommodations for about 62 men students. The rooms in the dormitories are occupied by the upper classmen, hence new students find it necessary to room in private houses. The rooms in the college dormitories are unfurnished; for the most part they are arranged in suites of three, — one study room and two bedrooms. These rooms are heated by steam and lighted by electricity; they are cared for by students occupying them. The dormitory rent for each person varies from \$39 to \$66 a year. The rent for furnished rooms in private houses ranges from \$1 to \$4 a week for each occupant. Correspondence in regard to rooms should be addressed to the dean of the college.

Board may be obtained at the college dining hall. At present, the price of board there is \$7 a week.

Expenses.

The necessary college expenses are estimated as follows:—

Tuition: citizens of Massachusetts, free; other citizens of the United States, \$60 a year; foreigners, \$120 a year.

	Low.	High.
Matriculation fee, first year,	\$5 00	\$5 00
Room in college dormitories or in private houses,	39 00	110 00
Board, \$7 per week,	252 00	252 00
Laundry, 50 to 85 cents a week,	18 00	30 00
Laboratory fees,	5 00	25 00
Books, stationery and miscellaneous items,	31 00	53 00
	<hr/>	<hr/>
	\$350 00	\$475 00

¹ This statement applies to those registering as regular or two-year students.

OTHER EXPENSES.—Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from \$15 to \$30 a year. Additional financial responsibility is also assumed by students joining a fraternity or entering into other social activities of the college. Students rooming in college dormitories are obliged to equip their own rooms with furniture. The college assumes no responsibility in regard to the safe keeping of student property either during the college term or vacations, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling, the economical student will probably spend between \$400 and \$500 per year.

INITIAL CHARGES.

At the opening of the college year, before students are registered in their classes, the following charges are payable at the treasurer's office:—

	Freshmen.	Sophomores.	Juniors and Seniors.
Matriculation fee,	\$5 00	-	-
Board (if at college dining hall) four weeks in advance,	28 00	\$28 00	\$28 00
Assessment for support of Social Union,	1 50	1 50	1 50
Laboratory fees,	5 00	5 00	2 00-10 00
Room rent (if in college dormitory),	-	-	12 00-20 00
Student tax for support of athletics, ¹	4 00	4 00	4 00
Student tax for support of nonathletic activities, ¹ .	2 50	2 50	2 50

¹ While this is not essentially a college charge, the treasurer of the college acts as collector for the student activity, and all students are expected to make the payment as indicated. The subscription price of the "Collegian" is fixed by the managers; the amount of athletic tax by vote of the student body.

LABORATORY FEES.

The principles observed in establishing laboratory fees are the requirement that students pay for those materials actually used which cannot be supplied by the individual, and that the laboratory fees include a charge sufficient to guard against wanton waste and breakage. Fees may be established for any course without previous announcement. At present, the fees charged are as follows:—

Agronomy:—	Per Term.
Course 1, 1,	\$1 50
Course 27, 3,	2 00
Course 50, 1,	2 50
Course 51, 3,	2 50
Course 75, 1,	2 00
Course 77, 2,	2 50
Course 78, 3,	2 50

Animal husbandry: —

Per Term.

Course 1,	\$1 00
Course 25, 1,	1 50
Course 26, 2,	1 50
Course 75, 1,	1 50
Course 78, 2,	1 00

Dairying: —

Course 50, 1,	2 50
Course 51, 3,	2 50
Course 75, 2,	2 00
Course 76, 3,	3 00
Course 77, 1,	2 50

Farm management: —

Course 75, 1,	1 50
Course 76, 1,	1 50

Poultry husbandry: —

Course 51, 1,	2 50
Course 53, 3,	3 00
Course 55, 3,	2 50
Course 76, 1,	2 00
Course 77, 1,	2 00

Rural engineering: —

Course 25, 1,	1 50
Course 26, 2,	1 50
Course 75, 1,	1 50
Course 78, 3,	1 50

Floriculture: —

Course 50, 1,	2 50
Course 51, 2,	2 50
Course 52, 3,	2 50
Course 53, 1,	2 50
Course 75, 1,	2 00
Course 76, 2,	2 00
Course 77, 2,	2 50
Course 78, 3,	2 50

Forestry: —

Course 50, 1,	2 00
Course 51, 2,	3 00
Course 75, 1,	4 00

Landscape gardening: —

Course 50, 1,	2 50
Course 51, 2,	2 50
Course 52, 3,	2 50
Course 76, 2,	3 00
Course 77, 3,	3 00
Course 80, 1,	3 00
Course 81, 2,	3 00
Course 82, 3,	3 00

Vegetable gardening: —

Course 50, 3,	2 00
Course 51,	2 00
Course 52,	2 00
Course 53,	2 00
Course 75, 1,	3 00
Course 76, 2,	2 00

Pomology: —

Per Term.

[illegible]

Drawing: —

	Total	\$ 97.86
Course 25, 1,	• • • • • • • • • •	3 00
Course 26, 2,	• • • • • • • • • •	3 00
Course 27, 3,	• • • • • • • • • •	3 00

Botany:—

[illegible]

Entomology: —

[illegible]

Chemistry: 1 —

[illegible]

¹ An additional deposit of \$1 for Courses 1 to 6, inclusive, and \$2 for Courses 25 to 95, will be required to cover individual breakage. In case the laboratory breakage does not equal the deposit, the balance will be refunded.

Per Term.

[illegible]

Mathematics and engineering: —

[illegible]

Microbiology: —

[illegible]

Physics: —

[illegible]

Veterinary science: —

[illegible]

Zoölogy:—

[illegible]

Rural journalism: —

[illegible]

Music (each course),

ral home life:—								
Courses 25, 26, 27,	.	.	.	.	.	.	.	1 50
Courses 50, 51, 52.	.	.	.	.	.	.	.	4 00

Rooms.

Students are expected, as far as possible, to occupy rooms in the college dormitories. Students who do not live in the college dormitories must secure rooms approved by the college. The assignment of rooms, and the general supervision of the housing of students, is in charge of the dean. The inspection of student quarters is in charge of the commandant. At the end of each college year all unoccupied rooms will be thrown open for selection, and will be assigned to students according to classes.

Living Accommodations for Women Students.

Women students attending the college live in a dormitory provided for them, and take their meals at Draper Hall, which is located a short distance from the women's dormitory. The women's dormitory accommodates 98 girls, and is furnished. The present charge for room and board for women students is \$120 per term.

Student Aid.

SELF HELP. — Many students are obliged to find work of some sort to earn their way through college. A few men have met their entire expenses in this manner, many more have paid a large part of their expenses, and many have earned a small proportion of the cost of their college education; but the college recommends that no new student enter without having at least \$150 and preferably \$250 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money in the expectation of earning their way entirely. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in completing his college course, or, instead, to borrow money sufficient to carry him through. No student should undertake work that interferes with his studies, and students should understand that, owing to the large number of applications for employment, no one man can receive a large amount of work at the college. A number of students find opportunities for earning money without depending upon the college to furnish them with work.

So far as possible needy students will be employed in some department of the college. The divisions of agriculture and horticulture usually afford the most work, although there are several permanent janitorships available for students, and forty or more students are employed at the dining hall.

Application for student labor should be made directly to Kenyon L. Butterfield, president of the college. Applicants are required to present statements from parent or guardian and from a public official or other responsible person of the town or city in which they reside, explaining the necessity of the applicant's need of assistance. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor. The most desirable and responsible positions are naturally assigned to those needy students who have been in the institution longest and who have demonstrated their need and ability. Students, therefore, may find it rather difficult to obtain all the work they desire during their freshman year; as a matter of fact, however, any student who is capable of doing a variety of

things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

SPECIAL NOTICE TO NEEDEY STUDENTS. — In the last few years the demand for paid labor on the part of new students has far exceeded the amount of employment that the college can offer. The college cannot promise work to any student, particularly to freshmen; it accordingly urges prospective students who are dependent entirely upon their own efforts not to undertake the course before they have earned enough money to carry them through, or nearly through, the first year.

Memorial Hall.

Soon after the close of the World War the alumni, students, faculty and friends of the college subscribed \$150,000 for the erection of a soldier memorial building to be placed on the college campus. This building was completed in the summer of 1921. It is designed to serve as headquarters for the student activities, and as the center of the social life of the institution.

In the basement are bowling alleys, pool tables, a store, post office and barber shop. On the main floor are eight offices for leaders of various student activities, a large reading room, and a beautiful memorial room in which is found the tablet bearing the names of the sons of the college who gave their lives in the great war. On the second floor is an auditorium seating 350 persons. This room is also used for college dances.

Student Accounts.

The following rules are enforced concerning student accounts: —

No student will be allowed to graduate until all bills due the institution from him are paid.

College charges, such as room rent, laboratory fees and tuition, must be paid in advance, at the beginning of each term. This rule is strictly adhered to, and no student will be allowed to complete his registration until such payments are made.

Every student boarding at Draper Hall is required to pay at the beginning of each term at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if at any time during the term he is more than one week in arrears in his payment for board.

All money due for student labor shall at the discretion of the treasurer of the college be applied on account toward any bills that a student may owe to the institution.

Student Relations.

The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standards of student deportment.

Any student known to be guilty of dishonest conduct or practice must be reported by the instructor to the president for discipline.

The privileges of the college may be withdrawn from any student at any time, if such action is deemed advisable.

It should be understood that the college, acting through its president or any administrative officer designated by him, distinctly reserves the right,

not only to suspend or dismiss students, but also to name conditions under which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined but he may also be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences ("cuts"). According to the rules a student is allowed a certain percentage of absences from class and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet, if in the judgment of the college authorities a student is neglecting his work on account of these activities, the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct. Prospective students or their parents may, upon application, obtain a copy of the faculty rules governing student relations to the college.

Infirmary.

The college maintains an infirmary for the care of sick or injured students. The buildings now available for this purpose are quite inadequate for the needs of the institution, and it is hoped that in the near future other buildings of this kind may be erected and the general equipment somewhat amplified. At present two small buildings, built especially for hospital purposes, are used for the infirmary.

The following statement outlines the plan followed in the management of the infirmary with respect to students:—

MANAGEMENT OF THE INFIRMARY.

Supervision.

1. The infirmary is under the *general supervision* of Prof. Charles E. Marshall, who is designated as Supervisor of the Infirmary. Miss Grace Charman, the resident nurse, with Miss Marguerite Davis as assistant resident nurse, is in *immediate* charge of the infirmary.

Use of Infirmary.

2. Students are urged to go to the infirmary at any time that they are in need of the services rendered by the resident nurse or by a town physician. Inasmuch as the physical director gives special attention to all student diseases, it is to be expected that the majority of the students will go to the infirmary at his suggestion. This understanding, however, should in no way deter students from going to the infirmary voluntarily at any time.

General Health.

3. Students are urged to consult the physical director or the resident nurse immediately when signs of physical disorder appear. Severe attacks of cold or other forms of illness can usually be avoided if treatment is administered

in the incipient stage. The purpose of the infirmary is to help maintain the general good health of the students, as well as to furnish a suitable place for professional attention in cases of severe illness or accident.

General Fee.

4. The infirmary fee will be at the rate of \$2 a day, and will be charged when one or more meals are obtained at the infirmary, or when the student remains at the infirmary for one or more nights. A nominal charge will be made to out-patients for miscellaneous treatment of a minor character.

Additional Expenses.

5. In addition to the fee charged, as specified in paragraph 4, the following additional expenses will be charged to the patient:—

(a) *Nurses.*— In case a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.

(b) *Professional Service.*— If a student requires medical attention by a physician, he will be required to select his physician and become responsible for fees charged by the physician.

(c) *Supplies.*— Special medical supplies prescribed by a physician or nurse will be charged to the patient.

(d) *Laundry.*— Expense for personal laundry incurred by students while in the infirmary will be charged to the individual student.

B. COLLEGE ACTIVITIES.

General Exercises.

Chapel exercises are held two mornings each week. On Thursday an afternoon assembly is held, to which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. A special chapel service on Sunday is usually held during the winter months. Students are required to attend these general exercises, although the president is authorized to excuse from chapel any student who may object to attendance thereon because of his religious scruples, provided his request for excuse therefrom is endorsed by his parent or guardian.

Student Activities.

A large number of student organizations furnish opportunity to students for work and leadership.

The Massachusetts Agricultural College Social Union was established in 1907. All students become members of the union by paying a small fee. In the fall and winter months the union gives a series of entertainments, free to students and faculty.

The College Senate is composed of representatives of the junior and senior classes. This body serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The Young Men's Christian Association is active both socially and religiously. A Catholic club has also been organized.

The musical organizations include an orchestra, a mandolin club and a glee club. These furnish music for college meetings, and occasionally give concerts at the college and at other places.

A dramatic club has been organized, and each year presents a play.

The Public Speaking Council represents the students' interest in debate and oratory.

The Athletic Association represents in the college the interests of football, baseball, track, hockey and basket ball.

A rifle club has been organized for a few years. Teams representing this club have repeatedly won the intercollegiate championship of the country, both in indoor and outdoor contests.

The college publications are the "Massachusetts Collegian," published weekly by the student body, and the "Index," published annually by the members of the junior class.

A nonathletics student activities board, composed of alumni, faculty and students, has charge of the finances, schedules, etc., of the musical clubs, dramatic club and student publications.

C. ACADEMIC AND DEPARTMENTAL.

Degrees.

Those who complete a four-year course receive the degree of bachelor of science. The fee for graduation from the college is \$5.

Graduate students who complete the assigned courses will receive the degree of master of science upon the payment of a fee of \$10. Credit may sometimes be allowed towards this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-year course of study, and present a satisfactory thesis, will be granted the degree of doctor of philosophy.

Those to whom degrees are awarded must present themselves in person at commencement to receive them. No honorary degrees are conferred.

The honorary fraternity of Phi Kappa Phi has a chapter at the agricultural college. Students are elected to membership to this fraternity on the basis of scholarship. Elections are made from the highest tenth of the senior class who have attained an average grade of at least 85 per cent during their college course.

Prizes.

Prizes are given annually in several departments for excellence in study or for other special achievement. Prizes offered in 1921 were:—

AGRICULTURE. — The Grinnell prizes, given by Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, for excellence in theoretical and practical agriculture. Three prizes, \$25, \$15, \$10. The contest is open to those senior students whose record on the registrar's books shows an average standing of 80 or above for the technical work taken in the Divisions of Agriculture and Horticulture during the junior and senior years.

BOTANY. — The Hills prizes, given by Henry F. Hills of Amherst, amount to \$35 annually. Competition is open to members of the senior, junior and sophomore classes as follows: for the best herbarium, \$20; for the second

best herbarium, \$15. No collection deemed unworthy of a prize will be considered.

PUBLIC SPEAKING. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declamations in the Burnham contest, \$15 and \$10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, a gold medal and \$30 and \$15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, a gold medal and \$15. The preliminary contests in debate are open, under certain restrictions, to all regular students.

Awards and Prizes, 1921.

GRINNELL PRIZES. — The Grinnell prizes, given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture, were awarded as follows: —

First prize, Charles D. Kendall.

Second prize, James W. Alger.

Third prize, Richard B. Lambert.

PUBLIC SPEAKING. — The Burnham prizes were awarded to the students delivering the best and second best declamations, as follows: —

First prize, Richard G. Wendell, 1923.

Second prize, Alfred P. Staebner, 1924.

FLINT PRIZES. — The Flint prize was awarded to the student delivering the best oration, as follows: —

First prize, P. C. Lal, 1922.

HILLS PRIZES. — The Hills prizes for the best herbaria were awarded as follows: —

First prize, Leverett S. Woodworth, 1923.

Second prize, Edward N. Tisdale, 1923.

SOUTHERN ALUMNI BASEBALL CUP. — For the best all-round baseball player during the season of 1921 the Southern Alumni baseball cup was awarded to John D. Brigham of the class of 1921.

ALLEN LEON POND MEMORIAL MEDAL, FOR EXCELLENCE IN FOOTBALL. — The Allen Leon Pond memorial medal for general excellence in football was awarded to Mr. Starr King of the class of 1921. This medal is in memory of Allen Leon Pond of the class of 1920, who died Feb. 26, 1920.

DEGREES CONFERRED AND
ROLL OF STUDENTS

DEGREES CONFERRED—1921.

MASTER OF SCIENCE (M.Sc.).

Folsom, Josiah Chase, B.Sc., Massachusetts Agricultural College, .	South Hadley.
Mallorey, Alfred Sidney, B.Sc., Massachusetts Agricultural College, .	Lynn.
Stratford, Reginald Killmaster, Ontario Agricultural College (Toronto University),	Toronto, Ont., Can.

DOCTOR OF PHILOSOPHY (Ph.D.).

Porter, Bennet Allen, B.Sc., Massachusetts Agricultural College, .	Wallingford, Conn.
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BACHELOR OF SCIENCE (B.Sc.).

Alger, James Warren,	Reading.
Allen, Harold Kenneth,	Belchertown.
Allen, Henry Vaughn,	Concord.
Anderson, Charles Henry,	Medford.
Armstrong, Philip Brownell, as of the class of 1920,	Rutherford, N. J.
Bailey, William, Jr.,	Williamstown.
Baker, Louis Eliot,	Salem.
Baker, Russell Dexter,	Oxford, Me.
Ball, Lorin Earl,	Amherst.
Bögholt, Carl Möller, as of the class of 1919,	Newport, R. I.
Boynton, Raymond Woods, as of the class of 1919,	Hopkinton.
Brigham, John Dexter,	Sutton.
Brown, Paul Wilfred,	Fiskdale.
Bunker, Carroll Wooster, as of the class of 1920,	Dorchester.
Cameron, Viola Mary,	Amherst.
Cascio, Peter Joseph,	Willimantic, Conn.
Coombs, Roger Conklin,	Peabody.
Cooper, Lawrence Melville,	Charlemont.
Davenport, Frank Semore,	Dorchester.
Davidson, Donald Gordon, as of the class of 1920,	Amherst.
Davis, Orrin Chester,	Belchertown.
Dean, Herman Nelson,	Oakham.
Douglass, Donald Churchill,	Cambridge.
Dunbar, Charles Oliver, as of the class of 1919,	Westfield.
Edman, George William,	Orange.
Evers, Joseph Daniel,	Malden.
Fletcher, Francis Summers,	East Lynn.
Fuller, Lorenzo, as of the class of 1920,	Lowell.
Gaskill, Harland Everett,	Hopedale.
Geer, Herbert Leroy,	Three Rivers.
Gillette, Nathan Warner, as of the class of 1918,	Revere.
Gilligan, Gerald Mathew, as of the class of 1919,	West Warren.
Goff, Howard Mason, as of the class of 1919,	Cambridge.
Gould, Robert Meredith,	Shelburne.
Gray, Irving Emery,	Woods Hole.
Hagar, Joseph Archibald,	Marshfield Hills.
Haskins, Harold Arthur,	North Amherst.
Haslam, Emerson Francis,	Westwood.
Howard, Frederic,	Mansfield.

Howe, George Cole, as of the class of 1918,	Amherst.
Hunter, Harold Clayton,	South Hadley Falls.
Hurd, Davis Alden, as of the class of 1920,	Wellesley Hills.
Hurd, Gordon Killam,	Millbury.
Iorio, Carlo Antonio,	Springfield.
Jones, Robert Lambert, as of the class of 1920,	Attleboro.
Kendall, Charles Donald,	Worcester.
Kimball, William Lincoln, as of the class of 1919,	Orange.
King, Starr Margetts,	Pittsfield.
Kirkland, Lyle Lord,	Chester.
Knight, Frank Edward, as of the class of 1919,	Brimfield.
Lambert, Richard Bowles,	Gleasondale.
Landis, Edward Bowley,	Amherst.
Leighton, Arthur Whiting,	Abington.
Lent, Donald Ashford,	Maynard.
Lincoln, Newton Ewell,	Dorchester.
Lockwood, George Russell,	Waban.
Long, Albert Douglas,	Amherst.
Mackintosh, Charles Gideon,	Peabody.
Mallon, Charles Hugh,	East Braintree.
Mansell, Elton Jessup, as of the class of 1919,	Cambridge.
Martin, Laurence Paul, as of the class of 1920,	Malden.
McCarthy, Justin Jeremiah,	Arlington.
Mellen, Richard Adams,	Cambridge.
Newell, Philip Sanger,	West Newton.
Newton, Edward Buckland,	Holyoke.
O'Hara, Joseph Ernest,	Worcester.
Palmer, Walter Isaiah,	Amherst.
Peck, Richard Charles,	Shelburne.
Poole, Harold Walter, as of the class of 1919,	Hudson.
Pratt, Laurence Francis,	Leominster.
Preston, Everett Carroll,	Dorchester.
Quint, Isador Gabriel,	Boston.
Reed, Morris,	Worcester.
Rice, Henry Lawrence,	Somerville.
Robinson, Philip Luther,	South Dartmouth.
Rosoff, Samuel Nathaniel,	Springfield.
Russert, Marion Ruth,	Boston.
Sampson, Howard Jenney,	Fall River.
Sanford, Richard Herbert,	Westfield.
Scott, Clifton William, as of the class of 1920,	Buckland.
Slate, George Lewis,	Bernardston.
Sloan, Kenneth Wilson,	Amherst.
Smith, Jonathan Harold, as of the class of 1919,	Rosindale.
Smith, Richard Watson, Jr.,	West Rutland, Vt.
Snow, John Dow,	Arlington.
Starkey, Robert Lyman,	Fitchburg.
Stiles, Harry Stephen,	Lynn.
Tietz, Harrison,	Richmond Hill, L. I., N. Y.
Tillson, Reginald Drury,	Whitman.
VanLennep, Emily Bird,	Great Barrington.
Waite, Richard Austin,	Middlefield.
Watkins, Tscharnier Degraffenreidt,	Midlothian, Va.
Webster, Milton Fuller,	Malden.
West, Guy Clifford,	Amesbury.
Zercher, Frederick Kaupp,	Huntington, W. Va.

BACHELOR OF SCIENCE, HONORIS CAUSA.

Powell, James Congdon,	Newport, R. I.
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REGISTRATION, 1921-22.

GRADUATE STUDENTS.

Ali, Mehmed,	Smyrna, Asia Minor.
B.A., International College, Smyrna.	
Archibald, John G.,	Amherst.
B.S.A., Ontario Agricultural College, Toronto University.	
Avery, Roy C.,	New York City.
B.Sc., Connecticut Agricultural College.	
Bögholt, Carl M.,	Newport, R. I.
B.Sc., Massachusetts Agricultural College.	
Bonnell, Anna V.,	Elizabeth, N. J.
A.B., Mount Holyoke College.	
Buchanan, Walter G.,	Amherst.
B.Sc., Massachusetts Agricultural College.	
Campbell, Malcolm D.,	Raynham.
B.Sc., Massachusetts Agricultural College.	
Campbell, Walter J.,	Springfield.
A.B., M.A., Princeton University.	
Clark, Dorothy P.,	Newton.
A.B., Wellesley College.	
Coleman, Elizabeth,	Scranton, Pa.
A.B., Smith College.	
Dooley, Thomas P.,	Dorchester.
B.Sc., Massachusetts Agricultural College.	
Dowd, William L.,	North Amherst.
B.Sc., Massachusetts Agricultural College.	
Drain, Brooks D.,	Amherst.
B.Sc., Ohio State University.	
Drexel, Richard J.,	Tifton, Ga.
B.S.A., Georgia State College of Agriculture.	
Edwards, Mildred E.,	Kingston, R. I.
B.Sc., Rhode Island State College.	
Elder, Thomas E.,	Mount Hermon.
B.Sc., Cornell University.	
Flikkema, Renzy E.,	Morrison, Ill.
A.B., Hope College.	
Frellick, Arthur L.,	Everett.
B.Sc., Massachusetts Agricultural College.	
Frellick, Ralph S.,	Everett.
B.Sc., Franklin College.	
French, Arthur P.,	Amherst.
B.Sc., Ohio State University.	
French, Rowland B.,	Haverhill.
B.Sc., Dartmouth College.	
Garvey, Mary E. M.,	Amherst.
B.Sc., Massachusetts Agricultural College.	
Gifford, George E.,	Middleton.
B.Sc., Boston University.	
Gilligan, Gerald M.,	West Warren.
B.Sc., Massachusetts Agricultural College.	
Glover, Theodore W.,	North Easton.
B.Sc., Massachusetts Agricultural College.	
Godbout, J. Adelard,	Ste. Anne de la Pocatiere, P. Q., Can.
B.Sc., B.S.A., Ecole d'Agriculture de Ste. Anne de la Pocatiere.	

Gray, Adonis L.,	Huntingburg, Ind.
B.S.A., Purdue University.	
Harris, Roy D.,	Middlebury, Vt.
B.Sc., Middlebury College.	
Hood, Egerton G.,	Macdonald College, Quebec, Can.
B.S.A., Ontario Agricultural College, Toronto University.	
Howard, Major T. J.,	Atlanta, Ga.
A.B., Philander Smith College.	
B.D., Gammon Theological Seminary.	
Julian, Arthur N.,	Amherst.
B.A., Northwestern University.	
King, William C.,	San Antonio, Tex.
B.S.A., Texas Agricultural and Mechanical College.	
Kinney, Asa S.,	South Hadley.
B.Sc., Massachusetts Agricultural College.	
Le Duc, Ashley C.,	Westfield.
B.Sc., Massachusetts Agricultural College.	
Lincoln, Newton E.,	Dorchester.
B.Sc., Massachusetts Agricultural College.	
Lowe, C. Hiram,	Chinwangtao, N. C.
B.A., Pekin University.	
B.Sc., University of Illinois.	
McCrimmon, John G.,	Williamstown, Ont., Can.
B.S.A., Ontario Agricultural College, Toronto University.	
Merritt, L. A.,	Williamsburg.
B.Sc., Trinity College.	
Meserve, Charles A.,	Livermore Falls.
B.Sc., Massachusetts Institute of Technology.	
Ph.D., University of Erlangen, Bavaria.	
Morgan, Ezra L.,	Amherst.
A.B., McKendree College.	
M.A., University of Wisconsin.	
Morin, Adrien,	Saint Celestin, P. Q., Can.
B.S.A., Ecole d'Agriculture de Ste. Anne de la Pocatiere.	
Neill, James M.,	Clarion, Pa.
B.Sc., Alleghany College.	
Nirodi, Bhavani S.,	Madras, India.
B.A., University of Madras.	
O'Brien, Daniel W.,	Natick.
B.Sc., Massachusetts Agricultural College.	
Potter, David,	Concord.
B.Sc., Massachusetts Agricultural College.	
Pratt, Lawrence F.,	North Weymouth.
B.Sc., Massachusetts Agricultural College.	
Rice, Victor A.,	Amherst.
B.Sc., North Carolina State College.	
Robertson, William F.,	Framingham.
B.Sc., Massachusetts Agricultural College.	
Rogers, Roland W.,	Braintree.
B.Sc., Massachusetts Agricultural College.	
Sampson, Howard J.,	Fall River.
B.Sc., Massachusetts Agricultural College.	
Sanborn, Joseph R.,	North Amherst.
B.Sc., Massachusetts Agricultural College.	
Sanctuary, William C.,	Amherst.
B.Sc., Massachusetts Agricultural College.	
Serex, Paul, Jr.,	Amherst.
B.Sc., M.Sc., Massachusetts Agricultural College.	
Smith, Mrs. Edith H.,	Westfield.
B.A., Mount Holyoke College.	
Thelin, Guy,	Sioux Falls, S. D.
B.Sc., South Dakota State College.	
Tietz, Harrison M.,	Richmond Hill, N. Y.
B.Sc., Massachusetts Agricultural College.	

Towle, Dorothy,	Westfield.
B.A., Mount Holyoke College.	
Watson, Esther,	Boston.
B.Sc., Teachers College, Columbia University.	
Wolfe, Benjamin F.,	Columbia City, Ind.
B.S.A., Purdue University.	
Worthley, Harlan N.,	Amherst.
B.Sc., Massachusetts Agricultural College.	
Yount, Hubert W.,	Toledo, Ohio.
B.Sc.Agr., Ohio State University.	

Registered after the Catalogue for 1920 was published.

Dowd, William L.,	North Amherst.
B.Sc., Massachusetts Agricultural College.	
Godbout, J. Adelard,	Ste. Anne de la Pocatiere, P. Q., Can.
B.S., B.S.A., Ecole d'Agriculture de Ste. Anne de la Pocatiere.	
Knight, Frank E.,	Brimfield.
B.Sc., Massachusetts Agricultural College.	
Maginnis, John J.,	Lawrence.
B.Sc., Massachusetts Agricultural College.	
Meserve, Charles A.,	Livermore Falls, Me.
B.Sc., Massachusetts Institute of Technology.	
Ph.D., University of Erlangen, Bavaria.	
O'Hara, Joseph E.,	Worcester.
B.Sc., Massachusetts Agricultural College.	
Porter, Bennett A.,	Amherst.
B.Sc., Massachusetts Agricultural College.	
Rice, Victor A.,	Amherst.
B.Sc., North Carolina State College.	
Robertson, William F.,	Framingham.
B.Sc., Massachusetts Agricultural College.	
Rogers, Harriet O.,	New London, Conn.
B.Sc., Connecticut College for Women.	
Serex, Paul, Jr.,	Amherst.
B.Sc., M.Sc., Massachusetts Agricultural College.	
Smith, Irene I.,	Somerville.
B.A., Smith College.	
Smith, Susan A.,	Great Barrington.
B.Sc., Massachusetts Agricultural College.	
Tietz, Harrison M.,	Richmond Hill, N. Y.
B.Sc., Massachusetts Agricultural College.	
Tillson, Reginald D.,	Whitman.
B.Sc., Massachusetts Agricultural College.	
Worthley, Harlan N.,	Amherst.
B.Sc., Massachusetts Agricultural College.	

CLASS OF 1922 (SENIORS).

Acheson, Roger Melvin,	New Bedford,	Alpha Gamma Rho.
Andrews, John Hollis,	Vineyard Haven,	11 North College.
Bainton, Hubert Judson, ¹	Hyde Park,	12 North College.
Baker, George Louis,	Amherst,	124 West Street.
Barnard, Kenneth Allen,	Shelburne,	Q. T. V.
Beckwith, Robert Henry,	Pittsfield,	North College.
Bent, Leslie Dana,	Medfield,	Lambda Chi Alpha.
Blakely, Roger Wolcott,	Medford,	46 Pleasant Street.
Blanchard, Raymond Stanwood,	Wollaston,	3 North College.
Bromley, Stanley Willard,	Southbridge,	Alpha Gamma Rho.
Buck, Charles Alfred,	Mansfield,	Alpha Gamma Rho.
Burnett, Paul Lapham,	Leicester,	Theta Chi.
Burnham, Edwin Graham,	Springfield,	Lambda Chi Alpha.

¹ Work incomplete.

Carey, Edmund Thomas, . . .	Springfield, . . .	Kappa Gamma Phi.
Chapin, Ellis Warren, Jr., . . .	Chicopee Falls, . . .	11 North College.
Chase, Eleanor Frances, . . .	Amesbury, . . .	Abigail Adams House.
Clark, Clarence Frederick, . . .	Sunderland, . . .	Q. T. V.
Collins, Herbert Laurence, . . .	Arlington, . . .	Sigma Phi Epsilon.
Conant, Luman Binney, . . .	Waltham, . . .	Alpha Gamma Rho.
Cook, Frederick Belcher, . . .	Niantic, Conn., . . .	North College.
Cotton, George Asa, . . .	Woburn, . . .	Sigma Phi Epsilon.
Crawford, Alexander George, . . .	Waverley, . . .	15 South College.
Davis, Harold Sanborn, . . .	Belchertown, . . .	20 South College.
Degener, Otto, . . .	New York, N. Y., . . .	101 Butterfield Terrace.
Dwyer, James Edward, . . .	Sunderland, . . .	Alpha Sigma Phi.
Erysian, Harry Adrian, . . .	Chelsea, . . .	2 North College.
Field, Richard Edmund, . . .	Shelburne Falls, . . .	Q. T. V.
Freeman, Stanley Leonard, . . .	Needham, . . .	Lambda Chi Alpha.
Gilbert, Frank Albert, Jr., . . .	Brandon, Vt., . . .	Lambda Chi Alpha.
Gowdy, Carlyle Hale, . . .	Westfield, . . .	103 Pleasant Street.
Haskins, Philip Hall, . . .	North Amherst, . . .	Phi Sigma Kappa.
Higgin, Albert Snyder, . . .	Baltimore, Md., . . .	Alpha Sigma Phi.
Hodgson, Robert Moore, . . .	Boston, . . .	Q. T. V.
Holman, Reginald Newton, . . .	Somerville, . . .	Q. T. V.
Hooper, Francis Edwards, . . .	Revere, . . .	Sigma Phi Epsilon.
Hurder, Ruth Wasson, ¹ . . .	Milton, . . .	Abigail Adams House.
Hussey, Francis William, . . .	Whitinsville, . . .	15 South College.
Jackson, Belding Francis, . . .	Belchertown, . . .	20 South College.
Jordan, Raymond Douglas, ¹ . . .	Springfield, . . .	North College.
Kemp, George Austin, . . .	North Andover, . . .	16 South College.
Knapp, Irving Robinson, . . .	Seekonk, . . .	3 North College.
Kokoski, Frank Joseph, ¹ . . .	Amherst, . . .	53 Northampton Road.
Krasker, Abraham, ¹ . . .	Revere, . . .	14 South College.
Kroeck, Julius, Jr., . . .	Huntington, L. I., N. Y., . . .	Phi Sigma Kappa.
Lacroix, Donald Sewall, ¹ . . .	Rowley, . . .	French Hall.
Lal, Prem Chand, . . .	India, . . .	9 North College.
Law, Hervey Fuller, . . .	Longmeadow, . . .	Experiment Station, care of Mr. Everson.
Leland, James Freeman, Jr., ¹ . . .	Sherborn, . . .	Alpha Sigma Phi.
Leonard, Earle Stanley, ¹ . . .	Hyde Park, . . .	Lambda Chi Alpha.
Lewandowski, John Neptumcen, ¹ . . .	Easthampton, . . .	Alpha Sigma Phi.
Lindquist, Harry Gotfred, . . .	Holden, . . .	11 North College.
Lovering, Everett Waldron, . . .	Northampton, . . .	283 Prospect Street, North- ampton.
Lovering, Rolland Frederick, ¹ . . .	Northampton, . . .	283 Prospect Street, North- ampton.
Lowery, John Gordon, . . .	Malden, . . .	Kappa Sigma.
Lyons, Edgar Albion, . . .	Methuen, . . .	36 North Prospect Steet.
Lyons, John Joseph, Jr., ¹ . . .	Arlington, . . .	Sigma Phi Epsilon.
Main, Stuart DeGross, . . .	Maplewood, N. J., . . .	101 Butterfield Terrace.
Martin, Edward William, . . .	Amherst, . . .	5 Phillips Street.
McGuinn, Albert Francis, . . .	Worcester, . . .	Alpha Sigma Phi.
McNulty, Raymond Henry, . . .	North Brookfield, . . .	Commons Club.
Moody, Kenneth Watts, . . .	Brookline, . . .	84 Pleasant Street.
Moseley, Henry Samson, ¹ . . .	Glastonbury, Conn., . . .	Alpha Sigma Phi.
Murdock, Matthew John, . . .	Medford, . . .	Q. T. V.
Murray, Harry Athol, Jr., . . .	Arlington, . . .	Theta Chi.
Murray, Myron George, . . .	Bradford, . . .	84 Pleasant Street.
Nigro, Henry, . . .	Revere, . . .	Commons Club.
Packer, George Blanchard, . . .	Woodbury, Conn., . . .	Sigma Phi Epsilon.
Peck, William Henry, . . .	Stow, . . .	Lambda Chi Alpha.
Perry, Helen Margaret, . . .	Waltham, . . .	Abigail Adams House.
Pickup, Ezra Alden, . . .	Holyoke, . . .	4 North College.
Pollard, Jane Isabel, ¹ . . .	North Adams, . . .	Abigail Adams House.
Randall, Kenneth Charles, . . .	Springfield, . . .	East Experiment Station, care of Mr. Everson.

¹ Work incomplete.

Reed, Paul Malcolm, ¹	Baldwinville,	Phi Sigma Kappa.
Richardson, Marjory,	Millis,	Abigail Adams House.
Roser, Conrad Herman,	Glastonbury, Conn.,	Phi Sigma Kappa.
Russell, Ralph,	Worcester,	15 North College.
Shaughnessy, Howard John,	Amherst,	51 Amity Street.
Smith, Albert William,	Easthampton,	Alpha Sigma Phi.
Smith, Rowland Piper, ¹	North Amherst,	46 Pleasant Street.
Spring, Hobart Wadsworth, ¹	Braintree,	Q. T. V.
Stevens, Ralph Shattuck, ¹	Arlington,	9 South College.
Sullivan, Joseph Timothy,	Lawrence,	Alpha Gamma Rho.
Swift, Arthur Lawrence,	North Amherst,	Summer Street.
Talmage, Harry John,	Springfield,	North College.
Tanner, Willis, ¹	Worcester,	7 North College.
Thompson, George Henry, Jr., ¹	Lenox,	Sigma Phi Epsilon.
Tucker, Francis Sample,	Arlington,	Alpha Sigma Phi.
Vinten, Charles Raymond,	Roxbury,	Theta Chi.
Walker, Philip Duane,	Hardwick,	Alpha Sigma Phi.
Warren, Edwin Herbert,	Chelmsford,	Lambda Chi Alpha.
Waugh, Frederick Vail,	Amherst,	Kappa Sigma.
Weber, Harold Richard, ¹	Brooklyn, N. Y.,	2 North College.
Wentsch, Harold Earle, ¹	Worcester,	Kappa Gamma Phi.
Whitaker, Carl Fales, ¹	Hadley,	Kappa Sigma.
White, George Edwin, ¹	Worcester,	Kappa Gamma Phi.
Wood, Clarence Milton,	West Somerville,	84 Pleasant Street.

CLASS OF 1923 (JUNIORS).

Abele, Trescott Tupper,	Quincy,	Theta Chi.
Alexander, Donald Briggs, ¹	Boston,	Sigma Phi Epsilon.
Alger, Mason Williams, ¹	West Bridgewater,	Alpha Gamma Rho.
Arrington, Luther Bailey,	Florence,	Alpha Gamma Rho.
Baker, Howard,	Marshfield,	Sigma Phi Epsilon.
Bartlett, Warren Leslie, ¹	Roslindale,	Phi Sigma Kappa.
Bateman, Eleanor Willard,	Arlington Heights,	Abigail Adams House.
Bates, Howard, ¹	Cohasset,	Kappa Gamma Phi.
Bates, Robert Brooks,	West Springfield,	Alpha Gamma Rho.
Beal, James Allen, ¹	Abington,	Kappa Sigma.
Bennett, James Stanley,	South Meriden, Conn.,	Alpha Gamma Rho.
Boles, Inza Almena, ¹	Dorchester,	Abigail Adams House.
Borgeson, Melvin Benjamin, ¹	Worcester,	Kappa Gamma Phi.
Brewer, Gardner Hunter,	Upton,	Stockbridge Hall.
Broderick, Lawrence Francis,	Hyde Park,	North College.
Buckley, Francis Edward, ¹	Natick,	Kappa Sigma.
Burke, Edmund William,	Watertown,	Commons Club.
Cohen, Solomon, ¹	Dorchester,	10 North College.
Collins, Donald Keith, ¹	Rockland,	Theta Chi.
Corash, Paul,	Worcester,	14 South College.
Dickinson, Lewis Everett, Jr.,	Holyoke,	Commons Club.
Dowden, Philip Berry,	Sandwich,	Sigma Phi Epsilon.
Eldredge, Reuel West, ¹	Winchester,	Kappa Sigma.
Faneuf, John Benedict,	West Warren,	North College.
Farwell, Charles Austin, ¹	Turners Falls,	Alpha Sigma Phi.
Fitzpatrick, Leo Joseph,	Brockton,	North College.
Folsom, Owen Eugene, ¹	Roslindale,	Phi Sigma Kappa.
Friend, Roger Boynton,	Dorchester,	Alpha Gamma Rho.
Fuller, Robert Donald, ¹	Woburn,	Stockbridge Hall.
Gamzue, Benjamin, ¹	Holyoke,	13 South College.
Gerry, Bertram Irving, ¹	Peabody,	Alpha Gamma Rho.
Gildemeister, Mary Katherine, ¹	Belchertown,	Abigail Adams House.
Giles, Clifton Forrest, ¹	Newtonville,	Sigma Phi Epsilon.
Gold, Philip, ¹	Roxbury,	10 North College.
Gordon, Howard Reynolds, ¹	Ipswich,	Lambda Chi Alpha.

¹ Work incomplete.

Graves, George, ¹	Granville, Ohio,	9 Fearing Street.
Grayson, Raymond Henry, ¹	Milford,	Alpha Sigma Phi.
Hale, John Stancliff,	South Glastonbury, Conn.,	Phi Sigma Kappa.
Hallett, Melvin Bernard, ¹	Rockland,	East Experiment Station.
Hardy, Sherman Keeler, ¹	Littleton,	The Davenport.
Harrington, Robert John, ¹	Holyoke,	Alpha Sigma Phi.
Heath, Allan Jay, ¹	Newfane, Vt.,	Commons Club.
Hilyard, Norman Douglas, ¹	Lynn,	Q. T. V.
Hodsdon, Marshall Sinclair,	Melrose Highlands,	Phi Sigma Kappa.
Holley, George Gilbert,	Fiskdale,	Lambda Chi Alpha.
Hollis, Frederick Allen, ¹	Charlton,	8 North College.
Hunter, Henry Leander, Jr.,	Mt. Kisco, N. Y.,	Theta Chi.
Irish, Gilbert Henry,	Turner, Me.,	Lambda Chi Alpha.
Johnson, Cleon Bancroft,	Ipswich,	Commons Club.
Johnson, Eyrle Gray, ¹	Mattapan,	Lambda Chi Alpha.
Jones, Alan, ¹	Boston,	Alpha Gamma Rho.
Keith, Clifford Woodworth, ¹	Providence, R. I.,	Theta Chi.
Kelley, Rodney Fredric,	Long Lake, Minn.,	Eames Street.
Labrovitz, Rose Florence, ¹	Amherst,	11 Amity Street.
Lawrence, Robert Parker, ¹	East Greenwich, R. I.,	Lambda Chi Alpha.
Lewis, Molly LeBaron,	Jamaica Plain,	Abigail Adams House.
Lindskog, Gustaf Elmer Richard,	Roxbury,	Clark Hall.
Luddington, Frank Dennison, ¹	Hamden, Conn.,	North College.
MacCready, Donald Eugene,	Elizabeth, N. J.,	Veterinary Laboratory.
Marshall, Alexander Borea, ¹	Greenwich, Conn.,	Theta Chi.
Marshman, Wilbur Horace,	Springfield,	Kappa Sigma.
Martin, Frances Barbara, ¹	Amherst,	5 Phillips Street.
Martin, Robert Fitz-Randolph, ¹	Amherst,	Amherst House.
Mather, Edna,	Amherst,	5 Allen Street.
Mohamedi, Sageer,	India,	One Acre, Mt. Pleasant.
Mohor, Robert deSales, ¹	Newton Centre,	Phi Sigma Kappa.
Mudgett, Vernon Downer,	Brookline,	Lambda Chi Alpha.
Newell, Richard Carll,	West Springfield,	Alpha Gamma Rho.
Norcross, Harry Cecil,	Brimfield,	Lambda Chi Alpha.
Nowers, Donald Gilford, ¹	Danvers,	Lambda Chi Alpha.
Paddock, Wallace Earl,	Worcester,	Lambda Chi Alpha.
Partington, Clyde Nash, ¹	Medford,	9 Phillips Street.
Picard, Charles Francis,	Plymouth,	Commons Club.
Putnam, Ernest Taylor, ¹	Greenfield,	Commons Club.
Richards, Homer Flint, ¹	Reading,	Theta Chi.
Richardson, Mark Morton,	West Brookfield,	9 South College.
Roberts, Arthur William,	Hyde Park,	Theta Chi.
Russell, Charles Francis, ¹	Winchendon,	5 Fearing Street.
Sadow, Alexander,	Pittsfield,	13 South College.
Sargent, Richmond Holmes, ¹	Buxton, Me.,	Kappa Sigma.
Sears, Fred Grant, Jr.,	Dalton,	Phi Sigma Kappa.
Sharpe, Charles Gertner,	Amherst,	13 Page Street.
Shea, Thomas Francis, ¹	Holyoke,	Kappa Gamma Phi.
Slade, Irving Woodman,	Chelsea,	Kappa Sigma.
Smith, Jeffrey Poole,	West Roxbury,	North College.
Snow, Thomas Lathrop,	Greenfield,	Alpha Gamma Rho.
Tanner, Edwin,	Worcester,	7 North College.
Tarr, James Gordon,	Gloucester,	Sigma Phi Epsilon.
Task, Mortimer,	West Stoughton,	15 North College.
Tisdale, Edward Norman, ¹	Medfield,	16 South College.
Towne, Carroll Alden,	Auburndale,	Q. T. V.
Towne, Warren Hannaford,	Cambridge,	Commons Club.
Tumey, Malcomb Edward, ¹	Deerfield,	Q. T. V.
Turner, Dorothy VanHoven, ¹	Washington, D. C.,	Abigail Adams House.
Walsh, John Leonard, ¹	Amherst,	Kappa Gamma Phi.
Wendell, Richard Goodwin,	Belmont,	Phi Sigma Kappa.
Whitaker, Holden,	Newton Highlands,	Q. T. V.
Whittier, John McKey,	Brookline,	Kappa Sigma.

¹ Work incomplete.

Williams, Forrest Earl, ¹	Sunderland,	Q. T. V.
Wirth, Conrad Louis, ¹	Minneapolis, Minn.,	Kappa Sigma.
Woodworth, Leverett Stearns,	Newton,	Veterinary Building.

CLASS OF 1924 (SOPHOMORES).

Arangelovich, Danitza, ¹	Belgrad, Serbia,	Abigail Adams House.
Atkins, Harold Kent, ¹	Weehawken, N. J.,	73 Pleasant Street.
Ball, Kenneth Moore,	Bloomfield, N. J.,	Phi Sigma Kappa.
Barrows, Robert Arthur,	Quincy,	Lambda Chi Alpha.
Barteaux, Frank Everett, ¹	Framingham,	Kappa Gamma Phi.
Bartlett, Frederick Sheldon,	Westfield,	Sigma Phi Epsilon.
Bartlett, Perry Goodell,	Holyoke,	Lambda Chi Alpha.
Belden, Clifford Luce,	Bradstreet,	Kappa Sigma.
Bike, Edward Louis,	Westfield,	Sigma Phi Epsilon.
Bliss, Elisha French, Jr.,	Springfield,	Alpha Sigma Phi.
Bowes, Charles Atwell,	Worcester,	Q. T. V.
Brunner, Fred, Jr., ¹	New York, N. Y.,	Phi Sigma Kappa.
Cahalane, Victor Harrison,	Charlestown, N. H.,	83 Pleasant Street.
Carpenter, Earle Stanton,	Rehoboth,	Alpha Sigma Phi.
Chase, Theodore Martin, ¹	Wayne, Me.,	Phi Sigma Kappa.
Cromack, Earl Augustus, ¹	Shelburne,	Theta Chi.
Darling, Robert Martin, ¹	Cambridge,	Q. T. V.
Davis, Howard Halsey, ¹	Brockton,	11 South College.
Deuel, Charles Frederick, 2d,	Amherst,	30 Lincoln Avenue.
Dewart, Hartley, ¹	Boston,	81 Pleasant Street.
Dimock, Walter Lewis,	Oxford,	Theta Chi.
Dixon, William Quinlan, ¹	Harford, Pa.,	44 Triangle Street.
Dresser, Allen Lucius, ¹	Leominster,	Q. T. V.
Elliott, James Alexander,	Summit, N. J.,	Care of Mr. Geo. Cooley, Sunderland.
Emery, George Edward,	Marlborough,	31 East Pleasant Street.
Epps, Martha Belle Scott,	Wilbraham,	Abigail Adams House.
Fenton, John Michael, ¹	Amherst,	108 Pleasant Street.
Fernald, Leland Hoyt,	Boston,	11 South College.
Flint, Ruth Guild, ¹	Allston,	Abigail Adams House.
Frost, Sherman Clark, ¹	West Somerville,	Sigma Phi Epsilon.
Frost, Willard Chamberlain, ¹	Milford,	Theta Chi.
Gadsby, James Herbert, ¹	North Adams,	36 North Prospect Street.
Garretson, Alfred Corwin, ¹	Bound Brook, N. J.,	Phi Sigma Kappa.
Gay, Alfred Fullick,	Groton,	120 Pleasant Street.
Geiger, Aimée Suzanne,	Pepperell,	Abigail Adams House.
Gifford, Richard Smith,	South Westport,	Sigma Phi Epsilon.
Goldsmith, Eliot Gray,	Chestnut Hill,	Kappa Sigma.
Grieve, Alexander Watson, ¹	Dorchester,	Alpha Gamma Rho.
Gryzwacz, Patrick Louis, ¹	Ware,	The Davenport.
Haskell, Malcolm Rawson,	Amherst,	27 Main Street.
Hayden, Luther Leonard, Jr.,	Brookville,	13 Phillips Street.
Hayes, William Bointon, ¹	South Deerfield,	73 Pleasant Street.
Hill, Carroll Victor, ¹	Worcester,	1 Allen Street.
Holteen, John Gunnar,	Quincy,	Kappa Gamma Phi.
Holway, Clarence Waren, ¹	Holden,	Experiment Station.
Hubbard, Doris, ¹	Newton,	Abigail Adams House.
Isaac, Carl Frederick, ¹	Brighton,	6 North College.
Kane, Edward Anthony,	Westfield,	5 North College.
Kennedy, Lowell Francis, ¹	Cambridge,	Q. T. V.
Kilbourn, James Sheldon, ¹	Cambridge,	Sigma Phi Epsilon.
King, Rosewell Howard,	Millville,	Alpha Sigma Phi.
Kopleman, Barry, ¹	Salem,	10 North College.
Lamb, Eric Franklin,	Waban,	Theta Chi.
Lane, Wilfred Craig,	Fitchburg,	Kappa Gamma Phi.
Leland, Allen Sanford,	East Bridgewater,	40 Sunset Avenue.
Loring, Kenneth Stockwell,	Melrose Highlands,	Lambda Chi Alpha.

¹ Work incomplete.

MacAfee, Norman Hoar, ¹	Somerville,	Alpha Gamma Rho.
Marlowe, George Alexander, ¹	Northampton,	1 Aldrich Street, Northampton.
Miller, Edwin Clark, ¹	Northampton,	354 Bridge Street, Northampton.
Morris, Walter Markley, ¹	Amherst,	116 Pleasant Street.
Myrick, Sterling,	Longmeadow,	16 South College.
Nelson, Carl Olaf,	Gloucester,	Alpha Gamma Rho.
Nicoll, Arthur Chester, ¹	Quincy,	Lambda Chi Alpha.
Noyes, Russell, ¹	Newtonville,	Theta Chi.
Nutting, Raymond Edwin, ¹	Fitchburg,	Kappa Gamma Phi.
Pearson, John Cleary, ¹	Cambridge,	116 Pleasant Street.
Percival, Gordon Pittinger,	Medfield,	6 North College.
Pierce, Arthur Edwin, ¹	Newton,	51 Amity Street.
Poey, Frederick, ²	Havana, Cuba,	Alpha Sigma Phi.
Porges, Nandor,	Hyde Park,	13 South College.
Pratt, Wallace Francis,	Rockland,	4 Nutting Avenue.
Read, John Gammons,	Springfield,	73 Pleasant Street.
Regan, Leon Ashley, ³	Walpole,	6 North College.
Reynolds, Joseph Sagar,	Attleboro,	Experiment Station.
Rhodes, Winthrop Gordon, ¹	Waban,	Theta Chi.
Ricker, Chester Sewall,	Worcester,	Alpha Sigma Phi.
Roeder, Frank Richason, ¹	Turners Falls,	Farm House.
Rowell, Elwyn Joseph, ¹	Amherst,	44 Triangle Street.
Rowell, Winston Hale, ¹	Hudson,	44 Triangle Street.
Salman, Kenneth Allen,	Needham,	Lambda Chi Alpha.
Schaffer, Carlton Hill, ¹	Ashfield,	17 North College.
Sellers, Wendell Folsom,	Melrose,	Alpha Gamma Rho.
Shepard, Harold Henry, ²	South Royalston,	Physics Building.
Sherman, Willis Whitney, ¹	Boston,	West Experiment Station.
Sims, Kenneth Wallace, ¹	South Boston,	Alpha Gamma Rho.
Slack, Marion Florence, ¹	Allston,	Abigail Adams House.
Smith, Richard Burr,	Greenfield,	Phi Sigma Kappa.
Smith, Vera Irene,	Amherst,	Abigail Adams House.
Staebner, Alfred Porter,	Willimantic, Conn.,	Kappa Sigma.
Steele, Charles Wasser,	Marblehead,	11 South College.
Steere, Robert Ernest,	Chepachet, R. I.,	103 Pleasant Street.
Stevenson, Harold Dudley,	Camden, Me.,	Alpha Gamma Rho.
Tarplin, Allan Sebastian, ¹	Brookline,	14 South College.
Tewhill, Charles James, ¹	Florence,	Farm House.
Thompson, Alice Elizabeth, ¹	Amherst,	Mount Pleasant.
Thornton, Clarence Percy,	Amherst,	R. F. D. 2.
Tileston, Roger Gordon, ¹	Sharon,	3 Nutting Avenue.
Tobey, Charles Sylvester, ¹	Belmont,	Phi Sigma Kappa.
Turner, Dana Burwell, ²	Chester,	Kappa Gamma Phi.
Varnum, Thomas, Jr.,	Lowell,	Phi Sigma Kappa.
Walker, Judson Newcombe,	Marlborough, N. H.,	30 North Prospect Street.
Waugh, Albert Edmund,	Amherst,	Stockbridge Road.
Weatherwax, Howard Erle,	Greenfield,	Theta Chi.
White, Samuel Henry,	Orange,	Lambda Chi Alpha.
Whitman, Chester Edgerly,	Uxbridge,	Phi Sigma Kappa.
Whitney, Richard Augustine,	Brooklyn, N. Y.,	Kappa Sigma.
Whitney, Will Alvah,	Taunton,	7 North College.
Williams, James Lowell,	Sunderland,	Q. T. V.
Wilson, Albert Arthur,	Dorchester,	Care of Mr. Green, Mount Pleasant.
Witt, Earl Maynard, ¹	Belchertown,	20 South College.
Wood, Ruth Millicent,	North Andover,	Abigail Adams House.
Wood, William Wilson,	Barre Plains,	51 Amity Street.
Woodworth, Robert Hugo,	Newton,	Phi Sigma Kappa.

¹ Work incomplete.² Admitted on probation. Entrance record not complete.³ Special sophomore.

CLASS OF 1925 (FRESHMEN).

Adams, Kathleen Poland, ¹	Worcester,	Abigail Adams House.
Aldrich, George Sidney, ¹	Millville,	56 Pleasant Street.
Allen, Edgar Webber, ¹	Medfield,	18 Nutting Avenue.
Anderson, Leslie Clayton,	East Bridgewater,	Farm House.
Anthony, Paul Leslie, ¹	Saugus,	Care of Mr. Hoyt, Pleasant Street.
Armstrong, Bradford,	Kensington, Md.,	Q. T. V.
Barker, John Stuart,	West Bridgewater,	Lambda Chi Alpha.
Barnes, Adrian Douglas, ¹	South Weymouth,	83 Pleasant Street.
Batal, James,	Lawrence,	18 Nutting Avenue.
Benoit, Helen Anna,	Amherst,	16 Belchertown Road.
Bilske, Francis Paul, ¹	Hadley,	The Davenport.
Binner, Roger Stokehill, ²	Malden,	29 Northampton Road.
Blanchard, Norman Harris, ¹	Pittsfield,	83 Pleasant Street.
Blass, Louis, Jr.,	Boston,	Kappa Gamma Phi.
Braun, Carl Frederic,	Montague City,	Farm House.
Bray, Ralph Hastings,	Framingham,	7 Phillips Street.
Burhoe, Sumner Othniel,	Ashland,	21 Fearing Street.
Burt, Orin Clark, Jr.,	Easthampton,	10 South College.
Cady, Harold Alden,	Worthington,	9 Phillips Street.
Cahill, Carl Winfield, ¹	Newburyport,	6 Nutting Avenue.
Case, Gilbert Eugene,	Greenwich,	30 North Prospect Street.
Casey, Alice Rita, ¹	Fall River,	Abigail Adams House.
Cassano, Joseph, ³	Groveland,	6 Boltwood Avenue.
Church, George Lyle,	Dorchester,	13 Phillips Street.
Cleaves, Leighton Greenwood,	Gardner,	9 Phillips Street.
Connors, Daniel Francis,	Dalton,	7 Phillips Street.
Cook, Peter, ²	East Bridgewater,	13 North College.
Cooke, Robert Gordon, ¹	Richmond,	5 Tillson Court.
Corwin, Emil Joseph,	East Boston,	73 Pleasant Street.
Craig, Kenneth Reeves, ¹	Jamaica Plain,	35 East Pleasant Street.
Crosby, John Samuel,	Arlington,	16 North College.
Currier, Leland Little,	Marblehead,	3 Allen Street.
Cutler, Walter Leon, ¹	Springfield, Vt.,	35 East Pleasant Street.
Davis, Osborne Ozro,	Belchertown,	Belchertown.
Dean, Lecil Wallace,	Jacksonville, Fla.,	66 Pleasant Street.
Dermion, Elise Gibson, ¹	Framingham,	Abigail Adams House.
DeVito, Dominick, ¹	Philadelphia, Pa.,	17 Phillips Street.
Drake, Dorothy Madeline, ¹	North Lexington,	Abigail Adams House.
Duffy, Leo Francis, ²	Palmer,	120 Pleasant Street.
Eldredge, Stuart,	Winchester,	6 Nutting Avenue.
Erickson, Emil Leonard,	Littleton,	44 McClellan Street.
Farrington, Linwood Henry, ¹	Chelmsford,	13 Phillips Street.
Fifield, Osgood Emerson, Jr.,	Springfield,	74 Main Street.
Fish, Donald Otis, ¹	Amherst,	12 Hallock Street.
Flexer, Carl Seler,	Allentown, Pa.,	81 Pleasant Street.
Fuller, Henry Elliot,	Melrose,	15 Hallock Street.
Gahan, Laurence Keith, ¹	Amherst,	East Pleasant Street.
Galbraith, Leo Lake,	South Hadley,	120 Pleasant Street.
Gannon, William James, ¹	Arlington,	35 North Prospect Street.
Gilbert, Chauncey McLean, ²	North Amherst,	Meadow Street.
Gleason, Harold Albert,	Chester,	Care of Mr. Hoyt, Pleasant Street.
Glidden, Wallace Newell, ¹	Barre,	23 East Pleasant Street.
Goldstein, Sebastian Abraham, ¹	Brockton,	70 Lincoln Avenue.
Gordon, Solomon,	Boston,	56 Pleasant Street.
Grout, Helen Myra, ¹	Gill,	3 Hallock Street.

¹ Work incomplete.² Admitted on probation. Entrance record not complete.³ Special freshman.

Grover, Walter Champion, . . .	Bernardston, . . .	9 Phillips Street.
Guild, Everett Joseph, . . .	Melrose Highlands, . . .	16 North College.
Guterman, Carl Edward Frederick, . . .	Springfield, . . .	53 Lincoln Avenue.
Haeussler, Gilbert Julius, . . .	Springfield, . . .	73 Pleasant Street.
Hale, Laurence Newton, . . .	South Glastonbury, Conn., . . .	83 Pleasant Street.
Hanscomb, George Wilmont, . . .	Boston, . . .	31 North Prospect Street.
Haworth, George Goodman, . . .	Dalton, . . .	7 Phillips Street.
Heald, Theodore Poyd, ¹ . . .	Amherst, . . .	73 Northampton Road.
Hobbs, Roger Williams, . . .	Fitchburg, . . .	101 Pleasant Street.
Holbrook, Lester Morse, . . .	New Bedford, . . .	29 North Prospect Street.
Hurley, Everett Henry, . . .	Northampton, . . .	31 East Pleasant Street.
Hutchins, Maurice Cressey, . . .	Auburndale, . . .	30 North Prospect Street.
Hyde, John Worthington, . . .	Amherst, . . .	55 Pleasant Street.
Icaza, Florencio, . . .	Panama, R. P., . . .	10 Hallock Street.
Ingraham, Edward Forster, . . .	Millis, . . .	31 East Pleasant Street.
Jack, Melvin Clifton, . . .	Amherst, . . .	16 Hallock Street.
Jack, Ronald Augustus, ¹ . . .	Amherst, . . .	16 Hallock Street.
Jones, Wendell Albert, . . .	Roslindale, . . .	6 Nutting Avenue.
Jonsberg, Henry Francis, . . .	Hyannis, . . .	37 Cottage Street.
Kafafian, Petros Sarkis, ² . . .	Armenia, . . .	North College.
Kakavas, James Christo, ¹ . . .	Lowell, . . .	9 Fearing Street.
Keith, Lewis Hayden, . . .	Bridgewater, . . .	53 Lincoln Avenue.
Kelso, George, ¹ . . .	Reading, . . .	7 Nutting Avenue.
Kingsbury, Amos Clark, ¹ . . .	Medfield, . . .	17 Phillips Street.
Kingston, Robert Lawrence, . . .	Boston, . . .	Care of Mr. Everson, Pleasant Street.
Knowles, George Artemas, . . .	Everett, . . .	29 Lincoln Avenue.
Langenbacher, Robert Frederick, . . .	Weehawken, N. J., . . .	73 Pleasant Street.
Lavallee, Louis Palmer, ¹ . . .	Worcester, . . .	5 Nutting Avenue.
Lewis, Donald Walter, . . .	Stow, . . .	10 South College.
Logan, Hazel Wayne, ¹ . . .	Brockton, . . .	Abigail Adams House.
Lord, John Frederic, . . .	Methuen, . . .	83 Pleasant Street.
Loud, Emery Shaw, . . .	Rockland, . . .	53 Lincoln Avenue.
Love, Andrew Wyllie, . . .	Auburn, . . .	23 East Pleasant Street.
Lovell, Hollis Reed, ¹ . . .	Falmouth, . . .	30 North Prospect Street.
Lunt, Samuel Wilde, . . .	Falmouth, Me., . . .	3 Allen Street.
Macauley, Donald Francis, ¹ . . .	Beverly, . . .	The Davenport.
Mahoney, Walter Francis, ¹ . . .	Millville, . . .	Care of Mrs. Henry Adams, North Amherst.
Malley, Frank Harold, ¹ . . .	Boston, . . .	13 North College.
Marx, Herbert John, . . .	Holyoke, . . .	4 Nutting Avenue.
McGeoch, Charles Ryerson, . . .	Providence, R. I., . . .	120 Pleasant Street.
McGrath, Thomas Edmund, ¹ . . .	Holyoke, . . .	66 Pleasant Street.
Meserve, George Donald, . . .	Hudson, . . .	44 Triangle Street.
Miller, Paul, ¹ . . .	Springfield, . . .	120 Pleasant Street.
Mouradian, Garabed Kevork, . . .	Bridgewater, . . .	53 Lincoln Avenue.
Moxon, David, 2d, . . .	Holyoke, . . .	4 Nutting Avenue.
Needham, Basil Arthur, ¹ . . .	Taunton, . . .	17 Phillips Street.
Nelson, Paul Redfield, . . .	Holyoke, . . .	84 Pleasant Street.
Nichols, Helen Louise, ¹ . . .	Northampton, . . .	Abigail Adams House.
Nolte, Whitney Roberts, ² . . .	Weston, . . .	27 Fearing Street.
Nylen, John Herbert, ¹ . . .	East Boston, . . .	73 Pleasant Street.
O'Connor, Arthur Maxwell, ¹ . . .	Amherst, . . .	One Acre, Mount Pleasant.
Oliver, Charles Frank, Jr., . . .	Brockton, . . .	14 North College.
Orentlickerman, Elsa Rebecca, ¹ . . .	Springfield, . . .	Abigail Adams House.
Parker, Donald Llewellyn, . . .	North Adams, . . .	35 East Pleasant Street.
Parsons, James Gilbert, . . .	Melrose Highlands, . . .	Baker Place.
Pearman, Marguerite Gertrude, . . .	Boston, . . .	Abigail Adams House.
Peckham, Carlisle Houghton, . . .	Melrose Highlands, . . .	9 Phillips Street.
Peirce, Veasey, . . .	Dorchester, . . .	5 Farview Way.
Peltier, Xavier Paul, ¹ . . .	Spencer, . . .	7 Nutting Avenue.
Post, Frank, ² . . .	Cambridge, . . .	120 Pleasant Street.

¹ Work incomplete.² Admitted on probation. Entrance record not complete.

Raffa, John Elias, . . .	Hatfield, . . .	35 East Pleasant Street.
Righter, Edwin Menzo, . . .	Altamont, N. Y., . . .	3 Allen Street.
Root, Frank Edson, . . .	Bernardston, . . .	Alpha Gamma Rho.
Ross, Charles Frederick, . . .	Lee, . . .	3 McClellan Street.
Ross, Donald Ernest, . . .	Berlin, . . .	35 Woodside Avenue.
Rowley, Harold Frederick, ¹ . . .	Wareham, . . .	15 Hallock Street.
Russell, May Elizabeth, . . .	Jamaica Plain, . . .	Abigail Adams House.
Ryan, Charles William, ¹ . . .	Hatfield, . . .	35 East Pleasant Street.
Sagermaster, James, ² . . .	Boston, . . .	56 Pleasant Street.
Salmon, Isaac Chenery, . . .	Turners Falls, . . .	5 Farview Way.
Samuels, Samuel Bernhard, . . .	Bronx, N. Y., . . .	17 Phillips Street.
Sazama, Robert Francis, . . .	Northampton, . . .	19 Arlington Street, North- ampton.
Seaver, Russell Bradford, . . .	East Bridgewater, . . .	Farm House.
Sheldon, Herbert Carl, . . .	Cliftondale, . . .	29 North Prospect Street.
Sheridan, Irwin Scott, ¹ . . .	Mansfield, . . .	Care of Mr. Green, Mount Pleasant.
Shumway, George Francis, . . .	Monson, . . .	21 Fearing Street.
Simmons, Carl Lafayette, . . .	Duxbury, . . .	18 Nutting Avenue.
Simpson, Gilbert, . . .	Holyoke, . . .	53 Lincoln Avenue.
Sinclair, Alma Bernice, ² . . .	Holyoke, . . .	Abigail Adams House.
Slade, Wesley Leland, . . .	Chelsea, . . .	6 Nutting Avenue.
Slown, William Arnold, . . .	Shelburne Falls, . . .	3 Nutting Avenue.
Smith, Emily Greenwood, . . .	Lee, . . .	Abigail Adams House.
Snow, Helen, ¹ . . .	Arlington, . . .	Abigail Adams House.
Sprague, Dudley de Rochemont, . . .	Melrose, . . .	66 Pleasant Street.
Staniford, Duncan Moar, ¹ . . .	Reading, . . .	7 Nutting Avenue.
Stephan, Edith Helen, . . .	Lawrence, . . .	Abigail Adams House.
Stone, George Leroy, . . .	Montello, . . .	Clark Hall.
Strong, Homer Bicknell, . . .	Dalton, . . .	13 Phillips Street.
Sullivan, Donald Clifford, . . .	Amherst, . . .	25 Gray Street.
Taube, Gustave, ¹ . . .	New York, N. Y., . . .	17 Phillips Street.
Taylor, Milton Wight, . . .	Chatham, . . .	31 East Pleasant Street.
Templeton, Robert James, . . .	Boston, . . .	8 North College.
Thompson, George Howard, ² . . .	Worcester, . . .	108 Pleasant Street.
Tufts, Robert Warner, . . .	North Weymouth, . . .	North Amherst.
Tuttle, Vernon Bradford, . . .	Warren, . . .	84 Pleasant Street.
Waite, Walter Eugene, ¹ . . .	Peekskill, N. Y., . . .	14 North College.
Walsh, Phillip Baker, ¹ . . .	Amherst, . . .	35 East Pleasant Street.
Ward, Gordon Hugh, . . .	Englewood, N. J., . . .	Farm House.
White, Earl Martin, ¹ . . .	Abington, . . .	23 East Pleasant Street.
Whittom, Walter Willard, . . .	Springfield, . . .	3 McClellan Street.
Wilcox, Stanley Dewey, ¹ . . .	Springfield, . . .	3 McClellan Street.
Wilder, Frank Harris, . . .	Sterling, . . .	3 Nutting Avenue.
Williams, Donald Reed, ¹ . . .	Northfield, . . .	116 Pleasant Street.
Wolfe, Arlie Frederick, . . .	Columbia City, Ind., . . .	North Amherst.
Woodbury, Samuel Lawrence, . . .	Springfield, . . .	75 Pleasant Street.
Zinn, Arnold Stanhope, . . .	New York, N. Y., . . .	83 Pleasant Street.
Zwisler, Frederick Fisher, ¹ . . .	Holyoke, . . .	18 Nutting Avenue.

SPECIAL STUDENTS.

Anderson, Verner Sixten, . . .	Hartford, Conn., . . .	35 North Prospect Street.
Boles, Leila Emily, . . .	Dorchester, . . .	Abigail Adams House.
Brennan, Joseph Edward, . . .	Millville, . . .	8 Allen Street.
Delaney, Rose Margaret, . . .	Holyoke, . . .	Draper Hall.
Foley, Mary Joanna, . . .	Worcester, . . .	Abigail Adams House.
French, Ernest Jerome, . . .	Lawrence, . . .	Care of Mr. Sheffield, North Amherst.
Hescock, Robert Eddy, . . .	West Brattleboro, Vt., . . .	M. A. C. Bungalow.
Kaiser, Armin Jacob, . . .	Evansville, Ind., . . .	120 Pleasant Street.

¹ Work incomplete.² Admitted on probation. Entrance record not complete.

Lane, Russell Montgomery, . . .	Riverhead, N. Y., . . .	120 Pleasant Street.
Loring, Frank Sumner, Jr., . . .	Gloucester, . . .	35 North Prospect Street.
McCoy, Arthur Middleton, . . .	Washington, D. C., . . .	Eames Street.
Perry, John Tuttle, . . .	Waltham, . . .	33 Park Street, Northamp- ton.
Wiklund, Carl John, . . .	Norfolk, . . .	4 North College.

Registered after the Catalogue for 1920 was published.

Bibber, Ann P., . . .	New Bedford.
Case, Brayton Clarke, . . .	Burma.
Davidson, Margaret Gordon, . . .	Amherst.
Elder, Jeannette Margaret, . . .	Amherst.
Grant, Mary A., . . .	Albany, N. Y.
Lucas, John Paul, . . .	Brighton.
McFarland, Alice, . . .	Grants Pass, Ore.
Mott, Mary E., . . .	Portland, Me.
Pellis, Abraham, . . .	Chelsea.
Pagliaro, Frank Mary, Jr., . . .	Springfield.

GEOGRAPHICAL SUMMARY.

Massachusetts, . . .	456
New York, . . .	14
Connecticut, . . .	11
New Jersey, . . .	9
Maine, . . .	7
Rhode Island, . . .	6
Vermont, . . .	5
Pennsylvania, . . .	5
Indiana, . . .	4
District of Columbia, . . .	2
Georgia, . . .	2
Maryland, . . .	2
Minnesota, . . .	2
New Hampshire, . . .	2
Ohio, . . .	2
Florida, . . .	1
Illinois, . . .	1
South Dakota, . . .	1
Texas, . . .	1
Canada, . . .	4
Cuba, . . .	1
Panama, . . .	1
Armenia, . . .	1
China, . . .	1
India, . . .	3
Serbia, . . .	1
Asia Minor, . . .	1
Total, . . .	546

SUMMARY BY CLASSES.

CLASS.	Men.	Women.	Total.
Graduate school, . . .	53	8	61
Senior class, 1922, . . .	91	5	96
Junior class, 1923, . . .	93	8	101
Sophomore class, 1924, . . .	104	9	113
Freshman class, 1925, . . .	147	15	162
Special, . . .	10	3	13
Totals, . . .	498	48	546

SHORT COURSE ENROLLMENT.

TWO-YEAR COURSE IN AGRICULTURE — GRADUATES, 1921.

Allen, Chester Carolton,	West Rutland.
Amsden, Maude Ella,	Petersham.
Baird, Francis William,	Waltham.
Baxter, Samuel Ballantine,	Tenafly, N. J.
Bennett, William Whytal,	Arlington.
Bronsdon, William Abbott,	Baldwinville.
Brooker, John Patrick,	Roxbury.
Bruce, Mary Elizabeth,	Dorchester.
Bryant, Frank Kenneth,	Lowell.
Burke, Leslie Joseph,	Medford.
Burnett, Marston,	Cambridge.
Burnham, Theodore Shelley,	Essex.
Camp, Emily Blackstone,	Norwich, Conn.
Carpenter, Ruth,	Hudson.
Carroll, Margaret Adelaide,	Dorchester.
Christensen, Frank William,	North Easton.
Clark, Chester Frederic,	Fitchburg.
Colton, Hartman Dudley,	Springfield.
Corey, Raymond Stanley,	Amherst.
Dill, Clarence Elmer,	Raynham Centre.
Dole, Stevens Field,	Greenfield.
DuFresne, Francis Armand,	Lenox.
Dunbar, Charles Basil,	Taunton.
Fay, Ula Ferguson,	East Orange, N. J.
Gallant, Daniel Joseph,	Gloucester.
Girard, Albert John,	East Brimfield.
Graumann, Lewis Matthew,	Roxbury.
Griffin, Artemas Gage,	Westford.
Hall, Helen,	Milton.
Hamilton, Grant Ethan,	Cyrus.
Hancock, Russell Hagen,	Tisbury.
Hartling, Wilfred Lewis,	West Quoddy, N. S.
Hartwell, Robert Mantor,	Buckland.
Haskell, Wilder Alexander,	South Hadley Falls.
Heinlein, Edward Bancroft,	South Natick.
Hoyt, Perley Luther,	Perkinsville, Vt.
Huntley, Robert Ernest,	West Somerville.
Jacques, John William,	Malden.
Jauncey, Oakleigh Wells,	Williamstown.
Judge, Clarence Peter,	Raynham.
Kallio, Toivo Matthew,	Middlefield.
Kimball, Howard Augustus,	Littleton.
Knight, Henry Elbridge,	Easton, Me.
Lawrence, Harold Tildon,	Rhodesia, South Africa.
Lawton, Edgar Lewis,	Brattleboro, Vt.
Libby, Ben Frank,	Springfield.
Libby, Carl Estes,	Springfield.
Lincoln, Leon Patterson,	Barre.
Lord, George Walker,	Framingham.
Lounsbury, Francis Edward,	Cambridge.

MacLeod, Norman Frederick,	Lynn.
Magoon, Austin William,	Greensboro Bend, Vt.
Morse, Harold Sterling,	Arlington.
Mullen, Frank Myles,	Fayville.
Newell, Joseph Delaplane,	Brooklyn, N. Y.
Nowers, Rodman Clark,	Danvers.
O'Brien, Katherine Frances,	Lawrence.
Owens, Zorayda Kathleen,	Haverhill.
Pellis, Abraham,	Chelsea.
Pickard, Herbert Peirce,	Concord Junction.
Priest, Atwood Wheeler,	North Vassalboro, Me.
Purdy, Donald Ring,	Waverley.
Quinn, William Robert,	Natick.
Richards, Osgood Samuel,	Jamaica Plain.
Rodwaye, George Wildemere,	Roslindale.
Root, Howard Chapin,	Colrain.
Russell, Paul Belford,	West Medway.
Shaw, Charles Dudley,	Westfield.
Shaw, Walter Bruce,	Sutton.
Smith, Raymond Leslie,	East Hartford, Conn.
Smith, Sidney Alexander,	Worcester.
Snelling, Samuel William,	Lincoln.
Spooner, William Danforth,	Brimfield.
Spring, Earle Nelson,	Millers Falls.
Steele, Gordon Ellis,	Waverley.
Talbot, William Joseph,	Amherst.
Taylor, Arthur Raymond,	Framingham.
Thorn, Henry Holton,	Deerfield.
Trafton, Walter Richard,	Swampscott.
Vartanian, Neshan,	Indian Orchard.
Veselak, Helen Clara,	Westfield.
Waterman, Harry Lester,	South Thomaston, Me.
Watson, Alan Wendell,	Providence, R. I.
White, Alice Louise,	Bristol, Conn.
White, Ralph Harold,	Barnard, Vt.
Wiggin, Theron Herman,	Norwood.
Wilson, Harvey William,	Boston.
Young, George Thomas,	Wilkinsonville.

VOCATIONAL POULTRY COURSE — GRADUATES, 1921.

Ashforth, Arthur Clifton,	Brookton.
Bartholomew, Francis Michael,	Amherst.
Brown, Joseph Harry,	Killingly, Conn.
Corcoran, James Joseph,	Boston.
D'Amelio, George,	Milford.
Donovan, Albert Peter,	Canada.
Fournier, Arthur,	Hawley.
Huleup, William,	Amherst.
King, Robert Ferris,	Amherst.

TWO-YEAR COURSE, 1921-22.

Second Year.

Adair, Eldred,	Roslindale,	18 Nutting Avenue.
Adams, John,	Cambridge,	18 Nutting Avenue.
Arp, Richard Dietrich,	North Amherst,	North Amherst.
Axtman, John Louis,	Chestnut Hill,	35 North Prospect Street.
Balmaine, James,	East Milton,	70 Lincoln Avenue.
Bard, John,	Amherst,	41 Pleasant Street.
Barney, Ernest Wellman,	Amherst,	6 Boltwood Avenue.
Bartholomew, Francis Michael,	Amherst,	6 South East Street.
Beaulieu, Frederick Armond,	North Attleborough,	8 High Street.

Belcher, Edgar Estes,	East Weymouth,	Care of E. F. Gaskill, Pleasant Street.
Bell, William T. A.,	South Boston,	101 Pleasant Street.
Benson, John Melvell,	Bar Harbor, Me.,	44 Pleasant Street.
Betterley, Guy William,	Brattleboro, Vt.,	108 Pleasant Street.
Boland, Albert Moore,	Worcester,	108 Pleasant Street.
Breen, Arthur Joseph,	Granby,	27 Fearing Street.
Breivogel, Henry Adam,	Amherst,	R. F. D., Box 27.
Bresnahan, John Francis,	Malden,	101 Pleasant Street.
Brown, Joseph Harry,	Killingly, Conn.,	1 Pease Avenue.
Brown, Milton Shumway,	Templeton,	41 East Pleasant Street.
Cahill, Paul Bennett,	Waltham,	35 East Pleasant Street.
Campbell, Lewis Harold,	Leominster,	8 Allen Street.
Carlson, Oscar Ernest,	Sweden,	66 Pleasant Street.
Carroll, Charles Raymond,	Amherst,	24 South East Street.
Castillo, Henry Aristides,	Troy, N. Y.,	Amherst, Box 500.
Castillo, Joseph A.,	Troy, N. Y.,	75 Pleasant Street.
Chamberlain, Bert N.,	Hudson,	15 Fearing Street.
Clifford, Lura Marion,	Greenfield,	Abigail Adams House.
Cluff, Victor Newton,	Lowell,	32 North Prospect Street.
Condon, Thomas Casey,	Medford,	15 Fearing Street.
Considine, Francis Anthony,	Watertown,	3 Nutting Avenue.
Cook, Ralph Walter,	Franklin,	29 McClellan Street.
Crowell, Elbridge Hodgman,	Boston,	3 Pleasant Street.
Cushman, John Kenneth,	Springfield,	17 Phillips Street.
D'Amelio, George G.,	Milford,	1 Pease Avenue.
David, James Vernon,	Amherst,	24 Belchertown Road.
DeLano, Wilbert Kilbourn,	Richmond, L. I., N. Y.,	32 North Prospect Street.
Diebner, Louis Theodore,	Amherst,	East Pleasant Street.
Donnellan, Arthur Lindsley,	Cobalt, Conn.,	21 Amity Street.
Dow, Don Cameron,	Keene, N. H.,	8 Allen Street.
Dunbar, Albert Jarvis,	Saugus,	3 Nutting Avenue.
Dupre, Norman Charles,	Grafton,	Care of H. J. Russell, Cottage Street.
Erickson, Karl Henrick,	Somerville,	70 Lincoln Avenue.
Etzel, George Frank,	Amherst,	23 South East Street.
Fazio, Charles Edward,	Springfield,	75 Pleasant Street.
Finnegan, Andrew Frederick,	Lowell,	35 East Pleasant Street.
Flagg, Nolan Randolph,	Worcester,	3 McClure Street.
Flaherty, Martin Robert,	Wamesit,	50 Lincoln Avenue.
Fletcher, Robert Longard,	Stow,	70 Lincoln Avenue.
Fournier, Arthur,	Hawley,	31 Hawley Street, Northampton.
Galbraith, Hermon William,	South Hadley,	120 Pleasant Street.
Galvin, Daniel Joseph,	South Boston,	35 North Prospect Street.
Gavett, George Billings,	Amherst,	25 Gray Street.
Geremonty, Francis Howard,	Stoneham,	101 Pleasant Street.
Gokey, Emery,	Rutland,	16 Nutting Avenue.
Green, George Alex,	Cambridge,	18 Nutting Avenue.
Griffin, Charles Mathew, Jr.,	Westford,	15 Hallock Street.
Gustafson, Gustaf Albert,	Sweden,	6 Phillips Street.
Hagan, Patrick,	Cambridge,	3 Nutting Avenue.
Harrington, William John,	Rutland, Vt.,	4 Orchard Street.
Harrison, Nicholas Peter,	London, Eng.,	30 North Prospect Street.
Haskins, Gerald Everard,	Amherst,	14 Amity Street.
Headberg, Axel Edward, Jr.,	West Somerville,	Amherst House.
Heald, Edwin Tracy,	Ashburnham,	21 Fearing Street.
Hibbard, Perley,	Dedham,	Stockbridge Hall.
Humphrey, Laurence Edmund,	Wareham,	3 McClellan Street.
Hurd, Merton Bartlett,	Spencer,	East Pleasant Street.
Jacomb, Constance Lucy,	Groton,	Abigail Adams House.
Jaekle, Matthew Lawrence,	Nantucket,	40 Mount Pleasant.
Johnson, Carl Eugene,	Gloucester,	Amherst Tavern.
Jordan, Llewellyn Powers,	Bar Harbor, Me.,	17 Phillips Street.

Kavanaugh, John Fordey,	Waltham,	Amherst Tavern.
Keirstead, Ralph Ramsay,	Worcester,	58 Main Street.
Keith, George Robert,	West Boylston,	North Amherst, R. F. D. 3.
Kesseli, Howard Maxwell,	Worcester,	12 McClure Street.
Knight, Allen, Jr.,	St. Johnsbury, Vt.,	29 East Pleasant Street.
Knightly, George Thomas,	Amherst,	2 Clifton Avenue.
Knowles, Frank Plumby,	Dorchester,	84 Pleasant Street.
Kohlrausch, George Edwin,	Chelsea,	3 McClellan Street.
Kruk, John Alexander,	South Deerfield,	South Deerfield.
LaGarde, Aldor Lewis,	Amherst,	Pelham Road.
Leavitt, Dorothy Wilmer,	Whitman,	Abigail Adams House.
LeBallister, Ralph Hammond,	Concord,	16 Amity Street.
LesCarbeau, Arthur Mitchel,	Providence,	Amherst, R. F. D. 2.
MacKnight, Harry Murchie,	Orange,	36 North Prospect Street.
Markham, Albert Gallitin,	Springfield,	Kolony Klub.
Martin, Charles J.,	Worcester,	15 Phillips Street.
McKenna, George Earle,	Orange,	36 North Prospect Street.
McLeod, Herbert Hugh,	North Amherst,	North Amherst.
Mills, Francis,	New York, N. Y.,	3 McClellan Street.
Motyka, John Joseph,	Amherst,	26 Cottage Street.
Nettleton, Francis Irving, Jr.,	Shelton, Conn.,	36 North Prospect Street.
Norrington, Henry,	Amherst,	8 North Prospect Street.
Norton, Frances Close,	Salisbury, Conn.,	Abigail Adams House.
Olson, Nils Theodore,	Dorchester,	17 Pleasant Street.
Packard, Edward Albert,	Dorchester,	116 Pleasant Street.
Packard, Marjory Emma,	Ashfield,	Abigail Adams House.
Paquett, Arthur Leon,	Malden,	16 Nutting Avenue.
Parsons, Howard Joel,	Conway,	58 Main Street.
Powell, Katharine Leslie,	Newton Center,	Abigail Adams House.
Prescott, William H.,	Holyoke,	The Davenport.
Ramsdell, Kenneth Hammond,	Southville,	Amherst House.
Rand, Arden Wilfred,	Amherst,	12 Beston Street.
Ravinski, Albert John,	Amherst,	Chestnut Street.
Raymond, Matthew George,	Shutesbury,	Shutesbury.
Rhodes, Charles Ernest,	Amherst,	32 Amity Street.
Rhodes, Paul Griggs,	East Lynn,	East Pleasant Street.
Ripley, David Hamilton,	Blandford,	3 McClellan Street.
Ritchie, Harry Ellsworth,	Rutland, Vt.,	4 Orchard Street.
Robinson, George Sutherland,	Lynn,	15 Fearing Street.
Ross, Ian Hamilton,	New York, N. Y.,	Kolony Klub.
Roy, Leon Joseph,	Lawrence,	15 Phillips Street.
Russell, Byron Roberts,	Palmer,	30 North Prospect Street.
Sanford, Paul Reed,	North Adams,	Kolony Klub.
Sargent, Edna May,	Chelmsford,	Abigail Adams House.
Sayles, Arthur Updike,	Providence, R. I.,	17 Phillips Street.
Sherwood, Joseph Morgan,	Huntington,	Cowles Lane.
Slate, Herbert Taylor,	Bernardston,	21 Fearing Street.
Smith, Willard Stevenson,	Holden,	One Acre, Mount Pleasant.
Standley, Wallace,	Middleton,	Care of C. F. Hoyt, Pleasant Street.
Stuart, Frances Elizabeth,	Bangor, Me.,	Abigail Adams House.
Sullivan, Joseph Stephen,	Holyoke,	47 Pleasant Street.
Sutton, Carlton Samuel,	Yarmouth Port,	Baker Place.
Thibault, Arthur Joseph,	Lowell,	15 Phillips Street.
Thompson, Burton Elmer,	West Somerville,	Care of G. L. Cooley, Sunderland.
Thouin, Faina Gladys,	Easthampton,	Abigail Adams House.
Tompkins, Harry Wilson,	Newton Upper Falls,	44 High Street.
Tyzzer, Gerald Edwards,	Wakefield,	41 Lincoln Avenue.
Unwin, Edward,	Amherst,	26 Cottage Street.
Vaber, John Edward,	Lee,	North Amherst.
Wadman, Loran Wood,	Medford,	Amherst, Box 517.
Watson, Grant Mack,	Amherst,	Amherst, R. F. D. 3, Box 72.
Wells, Alphonsus,	Brighton,	101 Pleasant Street.

White, Donald Mitchell, . . .	Brooklyn, N. Y., . . .	58 Main Street.
Willett, Frederick William, . . .	Lowell,	Amherst House.
Wilson, Frank Edward, . . .	Warren,	58 Main Street.
Wilson, Harold Elton, . . .	Graniteville, Vt., . . .	15 Phillips Street.
Woodworth, Ralph Merrill, . . .	Rawley,	6 Nutting Avenue.
Worthley, James Everett, . . .	Greenwood,	6 Nutting Avenue.

First Year.

Adams, Alton Wales, . . .	Brattleboro, Vt., . . .	108 Pleasant Street.
Albee, Frank Smith, . . .	Lee,	Poultry Plant.
Aldrich, Ernest Adams, . . .	Woonsocket, R. I., . . .	29 Lincoln Avenue.
Allen, Milton Clifford, . . .	North Dartmouth, . . .	29 North Prospect Street.
Ambrose, Earl Clifford, . . .	Amherst,	6 Phillips Street.
Armstrong, John Shepard, . . .	East Sandwich, . . .	23 East Pleasant Street.
Austin, Eunice Marie, . . .	Fall River,	Abigail Adams House.
Bacon, Harold Northrup, . . .	Wellfare Island, N. Y., . . .	70 Lincoln Avenue.
Baker, Arthur Ruey, . . .	Pleasantville, N. Y., . . .	53 Lincoln Avenue.
Baker, Nyles Anson, . . .	Granby,	30 North Prospect Street.
Bangs, Walter Albert, . . .	Somerville,	10 McClellan Street.
Barnicle, Edward Joseph, . . .	Waltham,	17 Kellogg Avenue.
Barrett, Avery Herbert, . . .	Brattleboro, Vt., . . .	70 Lincoln Avenue.
Barrett, David Joseph, . . .	Lee,	3 McClellan Street.
Beekman, Warren Amerman, . . .	Clover Hill, N. J., . . .	4 High Street.
Blake, Roger Clarence, . . .	East Bridgewater, . . .	Kolony Klub.
Booth, Sarah Elizabeth, . . .	Springfield,	Abigail Adams House.
Boyce, Charles Philip, . . .	Somerville,	116 Pleasant Street.
Brown, Herbert Ellsworth, . . .	Shrewsbury,	4 Chestnut Street.
Burrington, Frederick William, . . .	Heath,	15 Hallock Street.
Carlson, Carl Albert, . . .	Beverly,	45 Pleasant Street.
Carver, Richard Constance, . . .	Dwight,	Dwight.
Case, Richard Scofield, . . .	Winchester,	31 East Pleasant Street.
Chisholm, Roy Bedford, . . .	Dorchester,	27 Fearing Street.
Colbert, Murry Philip, . . .	Northampton,	One Acre, Mount Pleasant.
Colburn, Charles Hildreth, . . .	Westford,	North Amherst.
Cox, Henry Jarus, . . .	Melrose,	North Amherst.
Crandall, Alfred Arthur, . . .	Montpelier, Vt., . . .	Kolony Klub.
Daw, Elwyn Hudson, . . .	Woburn,	69 Main Street.
Dawkins, Albert Eugene, . . .	West Newbury,	12 Boston Street.
Daysh, George, . . .	Amherst,	Amherst, Box 579.
DeNyse, Arthur William, . . .	Amherst,	43 High Street.
Dickinson, Charles Augustus, . . .	North Amherst,	North Amherst.
Edminster, Allen W., . . .	Brooklyn, N. Y., . . .	Mount Pleasant, Care of Mr. Kenney.
Elliott, William James, . . .	Brookline,	Amity Street, Care of Mr. Austin Cowles.
Emerson, Theodore Waldo, . . .	Chelmsford,	13 Phillips Street.
Fairman, Frederick Donald, . . .	Amherst,	Amherst, R. F. D. 1.
Feeney, Charles Joseph, . . .	Cushman,	Cushman.
Fisher, William Smith, . . .	North Attleborough, . . .	Kolony Klub.
Foster, Henry Cope, . . .	Centerville, R. I., . . .	20 Lessey Street.
Frantz, Ralph W., . . .	St. Clair, Pa.,	19 Main Street.
Galanie, Demetrius Lincoln, . . .	Marlborough,	75 Pleasant Street.
Gallagher, James Henry, Jr., . . .	Revere,	Cushman.
Gallison, Winfield Hancock, . . .	Amherst,	4 Chestnut Street.
Gammon, Walter Elmer, . . .	Worcester,	Amity Street.
Gibbons, James William, . . .	Boston,	101 Pleasant Street.
Gibbs, Howard Manning, Jr., . . .	New Bedford,	83 Pleasant Street.
Graham, Elliott Charles, . . .	Suffield, Conn.,	58 Main Street.
Grayson, Donald Dean, . . .	South Milford,	Hatfield, Care of H. C. Wilcox.
Griswold, Ralph Emerson, . . .	Springfield,	24 Boston Street.
Harvey, William Moody, . . .	Waltham,	17 Kellogg Avenue.
Hastings, Edward Henry, . . .	Worcester,	116 Pleasant Street.

Haugland, John Richard, . . .	Somerville, . . .	101 Pleasant Street.
Hawthorne, Peter, Jr., . . .	Amherst, . . .	Shumway Street.
Hayward, Lester Burton, . . .	Amherst, . . .	West Street.
Hazard, James J., . . .	Westwood, . . .	East Pleasant Street.
Henry, Carl Blaney, . . .	Westborough, . . .	9 Fearing Street.
Hersome, Clyde Elwood, . . .	Lowell, . . .	116 Pleasant Street.
Hesse, Louis August, . . .	Hasbrouck Heights, N. J., . . .	20 Lessey Street.
Higgins, James Jeremiah, . . .	Worcester, . . .	3 McClure Street.
Hutchins, Roland Smith, . . .	Boston, . . .	75 Pleasant Street.
Jaastad, Ronald Charles, . . .	Boston, . . .	North Amherst.
Johnson, Harold Webster, . . .	Melrose Highlands, . . .	7 Nutting Avenue.
Jones, Lindsey Luther, . . .	Northborough, . . .	Care of Q. S. Warner, Pelham.
Kelley, Edward Bernard, . . .	South Hadley Falls, . . .	7 McClellan Street.
Kelly, S. Schofield, . . .	East Blackstone, . . .	29 Lincoln Avenue.
Kenison, Ralph Milton, . . .	Saugus, . . .	37 Cottage Street.
Kennedy, Francis Reid, . . .	Waltham, . . .	35 East Pleasant Street.
Kitchell, Wilfred Harold, . . .	Amherst, . . .	40 Amity Street.
Kleyla, Beatrice Barbara, . . .	South Deerfield, . . .	Abigail Adams House.
Kuppers, John Leonard, . . .	Worcester, . . .	20 Lessey Street.
Lawrence, Vernon Lane, . . .	Athol, . . .	17 Kellogg Avenue.
Legare, Roy Roosevelt, . . .	Petersham, . . .	7 Nutting Avenue.
Legro, Chester James, . . .	Lynn, . . .	27 Fearing Street.
Leitch, Fredonna, . . .	Amherst, . . .	9 College Avenue.
Luther, Bradford Wheeler, . . .	Fairhaven, . . .	East Pleasant Street.
Marble, Benjamin, . . .	West Berlin, . . .	15 Fearing Street.
Marshall, Frederick William, . . .	Altona, N. Y., . . .	3 Nutting Avenue.
Martin, Frank Raymond, . . .	Spencer, . . .	35 East Pleasant Street.
Mattimore, James Francis, . . .	Worcester, . . .	10 Kellogg Avenue.
McCarthy, John Lewis, . . .	Worcester, . . .	101 Pleasant Street.
McCurdy, Royden Whitcomb, . . .	Dorchester, . . .	Care of Dr. Goodale, North Amherst.
McKinstry, John Percy, . . .	Southbridge, . . .	94 Pleasant Street.
McNamara, Francis Joseph, . . .	Boston, . . .	116 Pleasant Street.
McPhee, Charles Joseph, . . .	Jamaica Plain, . . .	15 Hallock Street.
Meany, Joseph Jeremiah, . . .	Arlington, . . .	116 Pleasant Street.
Merrifield, Ralph Addison, . . .	Athol, . . .	58 Main Street.
Mitchell, Donald Campbell, . . .	Billerica, . . .	70 Lincoln Avenue.
Mulhern, William Francis, . . .	Boston, . . .	6 Phillips Street.
Murphy, Daniel John, . . .	Amherst, . . .	13 East Pleasant Street.
O'Brien, James Lawrence, . . .	Roxbury, . . .	6 Phillips Street.
O'Connell, Charles Gregory, . . .	Florence, . . .	72 Main Street.
O'Donnell, Joseph Charles, . . .	East Boston, . . .	Baker Place.
Osborne, Floyd Henry, . . .	Norwell, . . .	35 East Pleasant Street.
Outhuse, Donald Stedman, . . .	Littleton, . . .	East Pleasant Street.
Park, William Hamlin, . . .	Newtonville, . . .	9 Fearing Street.
Peirce, Elisha Nye, . . .	Waltham, . . .	35 East Pleasant Street.
Perry, Udell Thurston, . . .	Santuit, . . .	44 Pleasant Street.
Petersen, Richard Chittenden, . . .	Worcester, . . .	North Amherst.
Phinney, Henry, . . .	West Roxbury, . . .	East Pleasant Street.
Potter, Raymond Terry, . . .	Great Barrington, . . .	83 Pleasant Street.
Rambo, Samuel Everett, . . .	Grafton, . . .	4 Chestnut Street.
Rand, George L., . . .	Weymouth, . . .	18 Nutting Avenue.
Rawson, Floyd Stuart, . . .	East Douglas, . . .	17 Kellogg Avenue.
Richardson, Charles Edward, . . .	Cushman, . . .	Cushman.
Richardson, Milton C., . . .	West Brookfield, . . .	84 Pleasant Street.
Rivet, Clarence Arthur, . . .	Turners Falls, . . .	58 Main Street.
Ryan, Thomas Frederic, . . .	Holyoke, . . .	10 North Prospect Street.
Sahlin, Harry, . . .	Dorchester, . . .	20 Lessey Street.
Sawhill, John McKnight, . . .	Springfield, . . .	17 Kellogg Avenue.
Schnitzer, Harold Edward, . . .	Newport, R. I., . . .	8 Woodside Avenue.
Scribner, Harry V., . . .	Amherst, . . .	35 East Pleasant Street.
Shepherd, Owen, . . .	Bronxville, N. Y., . . .	16 Amity Street.
Silberberg, William Sedley, . . .	Winthrop, . . .	15 Hallock Street.
Slater, Joseph James, . . .	Amherst, . . .	14 McClellan Street.

Slattery, John Thomas, . . .	North Hatfield, . . .	32 High Street.
Smith, Charles Emerson, . . .	Westfield, N. J., . . .	70 Lincoln Avenue.
Smith, William, . . .	Whitinsville, . . .	35 North Prospect Street.
Spengler, Robert, . . .	Springfield, . . .	101 Pleasant Street.
Spooner, Edward Howland, . . .	Brimfield, . . .	22 North Prospect Street.
Sprague, Charles Gordon, . . .	Boston, . . .	The Davenport.
Stevenson, John, . . .	Sunderland, . . .	36 North Prospect Street.
Stever, Clifton Baird, . . .	Yarmouth Port, . . .	North Amherst.
Stickney, Burton Marsh, . . .	Chester, Vt., . . .	58 Main Street.
Strout, Raymond Luville, . . .	Steep Falls, Me., . . .	15 Hallock Street.
Sullivan, Edward Francis, . . .	Roxbury, . . .	31 Pleasant Street.
Sullivan, John Michael, . . .	Cambridge, . . .	3 Pleasant Street.
Sunbury, Kenneth Arthur, . . .	Lowell, . . .	116 Pleasant Street.
Swanson, Paul Fredolf, . . .	Chelmsford, . . .	42 McClellan Street.
Swenbeck, Herman Robert, . . .	Boston, . . .	4 High Street.
Taft, George Kenneth, . . .	Mendon, . . .	116 Pleasant Street.
Thomas, Lawrence Edward, . . .	Brattleboro, Vt., . . .	70 Lincoln Avenue.
Thomas, Leon Chessman, . . .	South Weymouth, . . .	83 Pleasant Street.
Tolman, John Lyman, . . .	Worcester, . . .	6½ Tillson Court.
Trull, Benjamin Franklin, . . .	Lowell, . . .	66 Pleasant Street.
Tufts, William Harold, . . .	North Easton, . . .	North Amherst.
Wade, Edwin Snow, . . .	Leeds, . . .	Care of J. G. Cook, R. F. D. 1.
Wales, Forrest Martin, . . .	Stoughton, . . .	Care of Dr. Goodale, North Amherst.
Walker, Wallace Hayward, . . .	Ashby, . . .	Pease Avenue.
Ward, Nelson Erwin, . . .	Buckland, . . .	94 Pleasant Street.
Warshaw, Raymond Stewart, . . .	New Dorp, Staten Island, N. Y.	4 Chestnut Street.
Washburn, Walter Allen, . . .	Marblehead, . . .	17 Phillips Street.
Weagle, Dennis William Scot, . . .	Marlborough, . . .	101 Pleasant Street.
Weber, Clarence Wilfred, . . .	Heath, . . .	15 Hallock Street.
Weed, Theodore Henry, . . .	Lenox, . . .	3 McClellan Street.
Wentworth, Wesley John, . . .	Amherst, . . .	R. F. D. 1, Amherst.
Westervelt, Harold Eric, . . .	Tenafly, N. J., . . .	23 East Pleasant Street.
Wheeler, Charles Paine, . . .	Springfield, . . .	Kolony Klub.
Whitaker, Wallace Herbert, . . .	Bernardston, . . .	North Amherst.
Wiedenmayer, George B., . . .	Glen Ridge, N. J., . . .	70 Lincoln Avenue.
Wilbur, Ella Brown, . . .	Orange, . . .	Abigail Adams House.
Wilson, Henry James, . . .	Amherst, . . .	R. F. D. 3, Box 74.
Woodward, Everett Brigham, . . .	Hubbardston, . . .	58 Main Street.
Wydeen, Albert Ferdinand, . . .	Amherst, . . .	R. F. D. 1, Amherst.
Yapp, Clifford Edward, . . .	Littleton, . . .	East Pleasant Street.

VOCATIONAL POULTRY COURSE, 1921-22.

Bardwell, George Arthur, . . .	Cambridge, . . .	24 Pleasant Street.
Beyer, Elmer Roland, . . .	Wakefield, . . .	Cushman.
Bobb, Lynn, . . .	Philadelphia, Pa., . . .	17 Kellogg Avenue.
Brandt, Ernest Arnold, . . .	Boylston, . . .	41 East Pleasant Street.
Brennan, William Kavanaugh, . . .	Boston, . . .	36 North Prospect Street.
Convery, Edward Francis, . . .	Amherst, . . .	47 Pleasant Street.
Coupard, Louis, . . .	Lexington, . . .	27 Fearing Street.
Daisy, Walter Edward, . . .	Roslindale, . . .	13 Amity Street.
Earl, John Joseph, . . .	Amherst, . . .	9 Pleasant Street.
Farndon, Charles Harold, . . .	Worcester, . . .	35 East Pleasant Street.
Gaudette, Claude Isreal, . . .	Amherst, . . .	13 Amity Street.
Graumann, Lewis Matthew, . . .	Roxbury, . . .	35 North Prospect Street.
Igo, Bernard James, . . .	West Somerville, . . .	35 North Prospect Street.
Jarvis, Henry Alexis, . . .	North Attleborough, . . .	Poultry Plant.
Leebrick, Frank Lee, . . .	Amherst, . . .	138 South Pleasant Street.
MacMillan, Murray, . . .	Medford, . . .	31 North Prospect Street.
McKenna, Philip James, . . .	Amherst, . . .	47 Chestnut Street.
Moore, Lloyd Weymouth, . . .	Worcester, . . .	3 McClure Street.
Morse, Herbert Edgar, . . .	Foxborough, . . .	18 Nutting Avenue.

Rodway, George Wildemere, . . .	Amherst,	9 Gaylord Street.
Stillwell, Albert Clifton, . . .	Brooklyn, N. Y., . . .	25 Pleasant Street.
Talbot, William Joseph, . . .	Amherst,	8 Hallock Street.
Walsh, Paul Bernard, . . .	Worcester,	24 Beston Street.
Walsh, William Harold, . . .	Jamaica Plain, . . .	Box 665, Amherst.
Warner, Harry Freeman, . . .	Boston,	35 East Pleasant Street.
Wilson, Harvey William, . . .	Boston,	R. F. D. 3, Box 74.

UNIT COURSE, SEPTEMBER, 1921.

Abel, Albert James,	Endoria, Ark.,	31 Pleasant Street.
Bevilacqua, Vito Luigi,	Fitchburg,	101 Pleasant Street.
Blanchette, William,	Athol,	North Amherst.
Brown, Ezra Palmer,	Solon, Me.,	East Pleasant Street.
Callard, Arthur Alfred,	Fall River,	5 Hillside Avenue.
Calvey, Daniel Francis,	Taunton,	East Pleasant Street.
Cannon, Timothy Francis, . . .	Amherst,	18 Nutting Avenue.
Edwards, Glenn Elsworth, . . .	New York, N. Y., . . .	101 Pleasant Street.
Faulkingham, Harris C.,	Amherst,	56 Pleasant Street.
Hurley, Joseph John,	Boston,	17 Pleasant Street.
Ivarson, Oscar Albert,	Amherst,	9 High Street.
Janse, Edward Adrian,	Amherst,	44 College Street.
Josey, Benjamin,	Granby,	Granby.
Joyce, Joseph,	Methuen,	35 East Pleasant Street.
Mailoux, Conrad,	Woonsocket, R. I., . . .	75 Pleasant Street.
Manson, Alexander,	Amherst,	Box 458, Amherst.
Maynard, Joseph Francis, . . .	Worcester,	45 Pleasant Street.
McGrath, Coleman Francis, . . .	Boston,	45 Pleasant Street.
Mendoza, Maurice Neail,	New Bedford,	41 East Pleasant Street.
Miller, Adam,	North Dana,	Box 469, Amherst.
O'Brien, Francis Xavier,	Amherst,	11 Salem Street.
Paull, Jacob John,	Middleborough,	5 Hillside Avenue.
Pelletier, Leon J.,	Framingham,	101 Pleasant Street.
Peters, Lawrence,	Amherst,	Baker Place.
Poole, Charles Harold,	Newton,	75 Pleasant Street.
Rico, Ramon Salvador,	Dorchester,	101 Pleasant Street.
Shulver, Arthur,	Pawtucket, R. I., . . .	4 Chestnut Street.
Weremey, John,	Amherst,	Stockbridge Road.
White, Sidney Henry,	Amherst,	13 South East Street.

WINTER SCHOOL, 1921.

Adams, David L.,	Springfield.
Allured, Karl B.,	Northampton.
Ayers, Walter G.,	Littleton.
Bertucio, Steven,	Fitchburg.
Boman, Lauri,	Ashburnham.
Brandt, Ernest A.,	Worcester.
Brown, Ossian R.,	South Swansea.
Burdett, Walter A.,	Leominster.
Carreiro, Frederick C.,	Brookline.
Casey, Willis A.,	Cambridge.
Chanin, Emma K.,	Rockville, Conn.
Clark, Alexander D.,	Revere.
Cook, Harold E.,	Franklin.
Cranston, Julius B.,	Pittsfield.
Crosier, Earl B.,	Dalton.
Crowell, Clarence A.,	Hyannis.
Davenport, Maurice J.,	Shelburne.
Day, Dorence P.,	West Kennebunk, Me.
Delay, James A.,	Scituate.
Deutsch, Miriam,	Baltic, Conn.
Dietrich, Henry A.,	Springfield.
Dobkins, Toma M.,	Ellington, Conn.

Donaghy, Mildred I.,	Medford.
Dowling, Everett E.,	Worcester.
Dunn, Edward C.,	Westborough.
Farrow, Henry G.,	Rockport, Me.
Fisher, Edward W.,	Newton.
Fliss, Stephen,	Chester.
Gale, Charles J.,	Amherst.
Giles, George,	Medford.
Godfrey, Clifton H.,	Sterling.
Gronberg, Clarence E.,	Quincy.
Hale, Arnold B.,	Tyringham.
Hannigan, William E.,	Mattapan.
Hart, Adrian P.,	Cambridge.
Hart, Lawrence W.,	Taunton.
Hawthorne, Robert,	Amherst.
Haynes, Julia A.,	Hyannis.
Herrick, Robert B.,	Winchester.
Heselton, Curtis L.,	Leominster.
Higgins, Myron E.,	Pittsfield, Me.
Holmgren, John U.,	Brookline.
Hooper, George L.,	Danvers.
Johnson, Elizabeth G.,	Holliston.
Judge, Charlotte F.,	Raynham Centre.
Kimball, Harlan W.,	Northborough.
King, Alouise A.,	Burlington, Vt.
Landon, William G.,	Stamford, Conn.
LeFever, George A.,	Chester, N. J.
Levitt, Benjamin I.,	Lebanon, Conn.
Lowry, Floyd P.,	Williamstown.
Lybeck, Inez L.,	New York, N. Y.
Maak, Henry G.,	Chester.
Martin, John P.,	Lawrence.
Miller, Elizabeth K.,	Rockville, Conn.
Newton, Earle C.,	Sterling.
Norell, Oscar,	Amherst.
Pomeroy, Leon R.,	Westfield.
Quinn, George E.,	Hopkinton, N. Y.
Raftery, Martin D.,	Tiverton, R. I.
Rose, Stephen D.,	Marblehead.
Ruud, Alfred,	Newton.
Samson, Josephine,	Greenfield.
Sawyer, Norman E.,	Sterling.
Sheaver, Lawrence E.,	Colrain.
Shute, Raymond W.,	West Newbury.
Smillie, James C.,	Branford, Conn.
Sowerby, Clifton E.,	Marlborough.
Spofford, Fred R.,	South Groveland.
Summers, Robert F.,	Quincy.
Thomas, Irwin E.,	New York, N. Y.
Tufts, James W.,	Amherst.
Upham, Esther N.,	Melrose.
Vondell, Harry L.,	Windsor, Vt.
Walker, Edwin H.,	East Pepperell.
Walker, Judson N.,	Marlboro, N. H.
Walker, Lowell K.,	Westborough.
Warke, Genevieve A.,	Arlington.
Waterhouse, James C.,	Biddeford, Me.
Welch, Edward P.,	Thornton Ferry, N. H.
Welchans, William H.,	Waltham.
Wenk, William J.,	Springfield.
Wilbur, Ella B.,	Orange.

SCHOOL FOR COUNTRY CLERGYMEN, 1921.

Anderson, W. S.,	Montague.
Barker, G. G.,	New Salem.
Brown, Charlotte,	New Boston.
Coldwell, S. A.,	Florida.
Dark, F. J.,	Swansea.
Garfield, E. C.,	West Brookfield.
Gooch, W. S.,	North Brookfield.
Goodrich, L. B.,	Taunton.
Groeziuger, C.,	Kingston.
Gustin, B. F.,	North Amherst.
Hope, A. H.,	Hadley.
Kendrich, A. D.,	Windsor, Conn.
Parke, Hervey C.,	Amherst.
Sherman, C. R.,	Williamstown.
Sherman, S. C.,	Rutland.
Thompson, G. L.,	Northfield.
Thurston, W. H.,	South Amherst.
Wakeman, W. W.,	Westwood.
Wightman, J. C.,	Northampton.

SUMMER SCHOOL, 1921.

Four Weeks' School.

Abbott, Florence Isabelle,	Andover.
Acton, Kathryn Irene,	Framingham.
Acton, Sara Veronica,	Framingham.
Adams, Mary Isabella,	Northampton.
Allen, Dorothy Whittemore,	Concord Junction..
Alley, Evelyn L.,	Boston.
Anderson, Edith Aleda,	Southwick.
Anderson, Ruby Besse,	Wareham.
Averill, Astrid Louisa,	Taunton.
Averill, George Warren,	Taunton.
Baker, Mary L.,	Boston.
Barry, Helen Elizabeth,	Westfield.
Bassett, Mildred Sara,	Islington.
Bellings, Amie Maria,	Springfield.
Bergeron, Noellia Corrine,	Amherst.
Berkovecova, Anna,	New York City.
Berry, Jennie M.,	Marlborough.
Bigelow, Florence Maude,	Winthrop.
Bill, Mary E.,	Sharon.
Blood, Elizabeth Lawrence,	Groton.
Boland, Grace Beatrice,	Fitchburg.
Bourne, Dorothy Dulles,	West Cornwall, Conn..
Bourne, James Russell,	West Cornwall, Conn..
Buchanan, Walter Gray,	Bernardston.
Burke, Grace Margaret,	Hadley.
Burr, Alice E.,	North Cohasset.
Bushnell, Clara Vance,	Braintree.
Callahan, Catherine Agnes,	Hadley.
Callahan, Ellen Elizabeth,	Hadley.
Canavan, Ann Mary,	Amherst.
Carlson, Oscar E.,	Vestervik, Sweden..
Clapp, Augustus Warren,	East Braintree.
Clark, Clara Louise,	North Amherst.
Clarke, Martha Alice,	Fall River.
Coldwell, Archibald Gates,	Haydenville.
Collis, Ada Estella,	Enfield.
Comins, Olive Gertrude,	Amherst.
Crocker, Charles Gilbert,	Amherst.
Crocker, Mary Lydia,	Nantucket.

Curtis, Betsey Pulcifer,	Gloucester.
Curtis, J. Louise G.,	Mount Vernon, N. Y.
Dana, Minnie Louise,	Amherst.
Daniels, Harry Edward,	Orangeburg, S. C.
Davenport, Elmer Freeman,	Holyoke.
Davidson, Donald Gordon,	Amherst.
Davis, Edith Luella,	Carlisle.
Delamare, Dorothy,	Oradell, N. J.
Dickinson, Ethel Merle,	Granville.
Dickinson, Leontine Elizabeth,	Simsbury, Conn.
Dormon, Marion Katharine,	Brookline.
Dwight, Louise Elizabeth,	Griswoldville.
Dwight, Mrs. Susan H.,	Griswoldville.
Eames, Helen Mildred,	Wilmington.
Elliott, Gladys S.,	Florence.
Elliott, Myrtle Clair,	Malden.
Emerson, Louise Kingman,	Braintree.
Estes, Lora Alberta,	Blackstone.
Fentem, Alice Elizabeth,	West Chester, Pa.
Fentem, Beth,	West Chester, Pa.,
Fitzgerald, Elizabeth Cecelia,	Bondsville.
Flaherty, Jane Sughrue,	Hadley.
Flaherty, Johanna Ruth,	Hadley.
Flaherty, Mary Elizabeth,	Hadley.
Frellick, Arthur Lester,	Everett.
Frellick, Ralph Stanley,	Fitchburg.
French, Alice Mabelle,	Bedford.
Fuller, Sarah Lois,	Quincy.
Gardner, Katherine,	Amherst.
Gates, Katharine Pomeroy,	Ludlow.
Gaynor, Margaret Frances,	Attleboro.
Gerrett, Helen Sophronia,	Greenfield.
Gibson, Chester Atkins,	Watertown.
Gilbert, Chauncey McLean,	North Amherst.
Gilfillan, May Candace,	St. Johnsbury, Vt.
Glancy, Anna Estelle,	Southbridge.
Goldsmith, Emily Augusta,	Cambridge.
Goldsmith, Gertrude Brown,	Manchester.
Goodwin, Olive Caroline,	Amherst.
Gorman, Josephine,	Holyoke.
Grady, May Frances,	Amherst.
Graves, Cora King,	Hatfield.
Hastings, Margaret Bell,	Hadley.
Hayford, Helen Coggins,	Attleboro.
Healey, Mary Winifred,	Whitinsville.
Heinritz, Louise Friederica,	Holyoke.
Heinstein, Esther Lucille,	Dorchester.
Hinds, E. Annette,	Three Rivers.
Hinds, Mary Ardelle,	Three Rivers.
Hoar, Angeline Lucy,	Amherst.
Hopkins, Viola Elizabeth,	Chicopee Falls.
Hutchinson, Joseph Patrick,	Boston.
Johnson, Leonora Arnold,	Brookline.
Johnson, Ruth Isabelle,	Springfield.
Jones, Bernice Allan,	Framingham.
Judge, Charlotte Frances,	Raynham Centre.
Keenan, Mary Etta,	Pawtucket, R. I.
Kelly, Alice Elizabeth,	Southbridge.
Kendall, Harold Holton,	Worcester.
Kenney, Irene Elizabeth,	Amherst.
King, Mabel Disa,	Roxbury.
Kirchner, Therese Helen,	Pittsfield.
Knightly, Mary Agnes,	Amherst.
LaFleur, Cecile Estelle,	Northampton.

Lapierre, Viola Agatha,	Griswoldville.
Learoyd, Jessie Putnam,	Danvers.
Leitch, Fredonna,	Amherst.
Link, Helen Clare,	South Deerfield.
Littlefield, Lillie C.,	Braintree.
Lolley, Ethel Emily,	Pelham.
Long, Anna L.,	Holyoke.
Loomis, Elsie Maud,	Ashland.
Loudon, Bessie Emma,	Monson.
Lovell, Mary Eleanor,	Wayland.
Lynch, Mary Anna,	Holyoke.
Lyons, Edwin,	Malden.
Lyons, Emma Augusta,	Malden.
MacArthur, Kenneth Cauldwell,	Cambridge.
MacCave, Doris Kathleen,	Amherst.
Malone, Rose Veronica,	Lenox.
Martin, Katharine Mary,	Amherst.
Martin, Lucille Antoinette,	Amherst.
Martin, Margaret,	Amherst.
Mather, Edna,	Amherst.
McCarthy, Mary Elizabeth,	Fitchburg.
McClintock, Annie,	Lawrence.
McDonald, Lillian Mary,	Holyoke.
McKennelly, Abby Gertrude,	Hopkinton.
Meadowcroft, Abbie Jane,	Brookline.
Mende, Pauline Mary,	Old Furnace.
Merritt, Lucius A.,	Chesterfield.
Moore, Helen Bessie,	North Adams.
Moriarty, Mary Todd,	Greenwich, Conn.
Mostrom, Harold Augustus,	Amherst.
Neil, Sabina Elizabeth,	Amherst.
Newlon, Charlotte R.,	Amherst.
Nichols, Beatrice,	New Ashford.
Nichols, Helen,	Greenfield.
Nowlan, Elizabeth Tennyson,	Amherst.
O'Brien, Elinor Mary,	Westborough.
O'Brien, Helen Agnes,	Westfield.
O'Connor, Arthur Maxwell,	Amherst.
O'Neill, Katherine Agnes,	Holyoke.
Page, Marion Dwight,	Amherst.
Papineau, Mary Margaret,	Dedham.
Park, Ruth,	East Walpole.
Parsons, Ruth Helen,	Mount Tom.
Patterson, Elizabeth Virginia,	Amherst.
Patterson, Jane,	Amherst.
Patterson, Mildred Cleaves,	North Natick.
Perham, Edith Belle,	Lowell.
Peters, Frances Howey,	Harvard.
Powers, Charles Aloysius,	Williamsburg.
Prand, Catherine,	Roxbury.
Prand, Rosa DeLyzy,	Roxbury.
Pulsifer, Pauline Fedora,	Haverhill.
Rice, Daisy Idella,	Charlemont.
Rice, Gratia Serena,	Charlemont.
Richardson, Eleanor Keep,	Amherst.
Rile, Mary Emily,	Stamford, Conn.
Risdon, Elizabeth Eva,	Amherst.
Ritz, Alice Marie,	Upton.
Robinson, Eva May,	Petersham.
Rorstrom, Hans Alfred,	Northampton.
Ross, Gertrude M.,	Salem.
Ryan, Margaret Alice,	Hatfield.
Ryan, Teresa,	Fall River.
Sanborn, Joseph Raymond,	North Amherst.

Sanborn, Lillian Winnifred,	North Amherst.
Sanford, Mrs. Alice Boardman,	New York City.
Sawyer, Bessie Frances,	Fitchburg.
Sawyer, Louise Willmott,	Fitchburg.
Sharpe, Charles Gertner,	Amherst.
Shaw, Beryl Mae,	Amherst.
Shay, Mary Etta,	Fall River.
Sheridan, Anne,	Wellesley Hills.
Sheridan, Katharine Elizabeth,	Wellesley Hills.
Simmons, Lester Winslow,	Dighton.
Smart, Harold William,	Amherst.
Smith, Hazel,	Northampton.
Smith, Lyon,	Brookline.
Spofford, Chester Porter,	Middleton.
Staples, Amey Peirce,	Myricks.
Stearns, Frank K.,	Lowell.
Stetson, Florence Mae,	Heath.
Sullivan, Katharine D.,	Framingham.
Tanner, Grace Naomi,	Washington, D. C.
Taylor, Mary Emily,	Amherst.
Thayer, Cassandana,	Quincy.
Timson, Minnie B.,	Hyde Park.
VanEveren, Alice B.,	Cambridge.
Wang, Harold,	Amherst.
Ward, Frances Willard,	Framingham.
Washington, Daisy,	Amherst.
Weatherwax, Howard Erle,	Greenfield.
Wheaton, Sarah Laura,	Springfield.
Wood, Helen Marjorie,	East Whately.
Woods, Emily Young,	Brookline.
Yale, Margaret,	Alder Creek, N. Y.
Young, Eleanor Melita,	Brookline.

School of Rural Home Life, July 18 to July 25, 1921.

Barry, Helen,	Erie, Pa.
Bishop, Mrs. E. H.,	Amherst.
Clark, Frances,	Chelmsford.
Cockle, M. L.,	New York City.
Currier, Mrs. Mary E.,	Wilmington.
Currier, Mary W.,	Wilmington.
Doane, Delia S.,	Wallingford, Conn.
Eastman, Frances M.,	Amherst.
Foley, Mary R.,	Amherst.
Hawthorne, Mrs. Gladys,	Amherst.
Irving, Mrs. Clarissa S.,	Greenfield.
Leach, Mrs. Lottie A.,	Walpole.
Lovering, Harriet H.,	Walpole.
O'Brien, Mrs. Edward J.,	Amherst.
Owen, Mrs. Lillian M.,	Waltham.
Thompson, Mrs. O. G.,	East Westmoreland, N. H.
Thresher, Mrs. G. A.,	Williamsburg.
Tibbetts, Mrs. Alice M.,	Wilmington.
Towle, Rosa P.,	Quantico, Va.
Vaughan, Mrs. P. C.,	Fitchburg.
Walker, Mrs. Lillian B.,	Amherst.
Wenzel, Mrs. Ethel M.,	Fitchburg.
Whittemore, Mrs. Mary B.,	Tufts College.
Wright, Mary B.,	Sunderland.

Eight Weeks' School for Two-year Students.

Axtman, John Louis,	Chestnut Hill.
Carroll, Charles Raymond,	Amherst.
Considine, Francis Anthony,	Watertown.

Diebner, Louis Theodore,	Gloucester.
Donnellan, Arthur Lindsley,	Cobalt, Conn.
Dunbar, Albert Jarvis,	Greenwood, R. I.
Etzel, George Frank,	Amherst.
Fazio, Charles Edward,	Springfield.
Finnegan, Andrew Frederick,	Lowell.
Galvin, Daniel Joseph,	South Boston.
Gavett, George Billings,	South Portland, Me.
Hagan, Patrick,	Cambridge.
Hannigan, William Edward,	Mattapan.
LaGarde, Aldor Lewis,	Amherst.
LesCarbeau, Arthur Mitchel,	Amherst.
Mack, Harvey C. S.,	Gloucester.
Marshall, Frederick William,	Roxbury.
Martin, Charles J.,	Worcester.
McLaughlin, George Reed, Jr.,	Charlestown.
McLeod, Herbert Hugh,	North Amherst.
Norrington, Henry,	Amherst.
Partenoft, Christo,	Middleborough.
Rand, Arden Wilfred,	Amherst.
Ravinski, Albert John,	Amherst.
Rhodes, Charles Ernest,	Amherst.
Rhodes, Paul Griggs,	Lynn.
Robinson, Leo Victor,	Petersham.
Roy, Leon Joseph,	Lawrence.
Smith, Willard Stevenson,	Westborough.
Stevenson, John,	Worcester.
Taylor, Edgar Raymond,	Amherst.
Thibault, Arthur Joseph,	Lowell.
Trebeck, Thomas,	Springfield, Vt.
Unwin, Edward,	Amherst.
Watson, Grant Mack,	Lowell.
Whitten, George,	Sanford River, Me.

Eight Weeks' School for Unit-course Students.

Bangs, Walter Albert,	Somerville.
Bardwell, George Arthur,	Boston.
Bevilacqua, Vito Luigi,	Fitchburg.
Beyea, Elmer Roland,	Wakefield.
Boyce, Charles Philip,	Somerville.
Bullock, James L.,	Bristol, R. I.
Callard, Arthur Alfred,	Fall River.
Cannon, Timothy Francis,	Roxbury.
Crehan, Owen Joseph,	Boston.
Daw, Elwyn Hudson,	Wamesit.
Dawkins, Albert Eugene,	Amherst.
DeGorio, Louis James,	Newton.
DeNyse, Arthur William,	Amherst.
Dunklee, Laurence Horner,	Providence, R. I.
Earl, John Joseph,	Amherst.
Faulkingham, Hans C.,	Amherst.
Feeney, Charles Joseph,	Cushman.
Fleming, Edward Malachi,	Medford.
Frantz, Ralph W.,	St. Clair, Pa.
Gallagher, James Henry,	Revere.
Gallison, Winfield Hancock,	Roxbury.
Gibbons, James William,	Boston.
Greenwood, Clarence Wesley,	Baldwinville.
Griswold, Ralph Emerson,	Springfield.
Haugland, John Richard,	Malden.
Hawthorne, Peter E., Jr.,	Amherst.
Herbert, John Edward,	Everett.
Ivarson, Oscar Albert,	Jamaica Plain.

Janse, Edward Adrian,	Amherst.
Jarvis, Henry Alexis,	North Attleborough.
Josey, Benjamin,	Granby.
Joyce, Joseph,	Methuen.
Lagimoniere, Ernest,	Amherst.
Libby, George Amos,	Amherst.
Mailloux, Conrad,	Woonsocket, R. I.
Manson, Alexander,	Amherst.
Martin, Frank Raymond,	Spencer.
McCarthy, John Lewis,	Worcester.
McGrath, Coleman Francis,	Roxbury.
McLean, Joseph Patrick,	Brookline.
Meany, Joseph Jeremiah,	Arlington.
Mendoza, Maurice Neil,	Amherst.
Mulhern, William Francis,	Hyde Park.
Murphy, Daniel John,	Amherst.
Norris, Charles Fredrick, Jr.,	Boston.
O'Brien, Francis Xavier,	Amherst.
O'Brien, James Laurence,	Mattapan.
O'Connell, Charles Gregory,	Florence.
Paull, Jacob John,	Amherst.
Peters, Lawrence,	Kearsarge, N. H.
Petersen, Ben Julius,	Stow.
Poole, Charles Harold,	Newton.
Rico, Ramon Salvador,	Dorchester.
Scribner, Harry Verne,	Waltham.
Slater, Joseph James,	Dorchester.
Spengler, Robert,	Springfield.
Sullivan, John Michael,	Cambridge.
Walsh, Paul Bernard,	Worcester.
Weagle, Dennis William Scot,	Marlborough.
Webb, Patrick Henry,	Lawrence.
Weremey, John,	Boston.
Wheeler, Alfred Edwin,	Dedham.
White, Sidney Henry,	Amherst.
Wolfers, Harry,	Roxbury.
Wydeen, Albert Ferdinand,	Bondsville.

STUDENTS REGISTERED AFTER THE CATALOGUE OF 1920 WAS PUBLISHED.

Two-year Course.

Cahill, Jerome Joseph,	Everett.
Doherty, James Wilfred,	Boston.
Elschner, Charles Robert,	Everett.
Gilbert, Chauncey McLean,	North Amherst.
Hopkinson, Harry Buss,	Bennington, Vt.
Manchester, Philip,	Fall River.
Riley, William Clinton,	Amherst.
Ross, Donald Ernest,	Hudson.
Shea, Maurice Joseph,	Worcester.

Vocational Poultry Course.

Udall, Robert Cornelius,	Barre.
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Unit Course.

Bourque, Joseph Leo,	Lynn.
Burke, James Andrew,	Dorchester.
Clouthier, Edward,	Brunswick, Me.
Cox, Thomas,	Lowell.
Dantos, Nicholas,	Haverhill.
Dineen, Walter James,	Revere.
Fesette, Bertie Elbert,	Manchester, N. H.
Graham, George Norman,	Lynn.

Guntner, Laurence Michael,	Boston.
Keller, Earle Franklin,	Augusta, Me.
Landers, Thomas John,	Woburn.
Letorney, Michael George,	Boston.
Orlande, John,	Boston.
Quinn, John Joseph,	Lowell.
Sheppard, Thomas,	Revere.
Sorli, Joseph A.,	Carlisle.
Vacher, John,	Amherst.
Weiby, Berger Kristian,	Jamaica Plain.

SUMMARY OF SHORT-COURSE ENROLLMENT.

	Men.	Women.	Total.
Two-year Course, second year,	129	9	138
Two-year Course, first year,	150	5	155
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Four Weeks' School,	31	168	199
School of Rural Home Life,	-	24	24
Eight Weeks' School for Two-year Students,	36	-	36
Eight Weeks' School for Unit-course Students,	65	-	65
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Counted twice,	78	-	78
Totals,	475	221	696

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YOUR STATE COLLEGE

FACTS FOR HIGH SCHOOL
STUDENTS



MASSACHUSETTS
AGRICULTURAL COLLEGE

THE M. A. C. BULLETIN AMHERST, MASSACHUSETTS

VOLUME XIV FEBRUARY, 1922 NUMBER 2

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AGRICULTURAL COLLEGE: JAN., FEB., MARCH, MAY,
JUNE, SEPT., OCT., NOV. ENTERED AT THE POST
OFFICE, AMHERST, MASS., AS SECOND CLASS MATTER

CATALOGUE OF THE COLLEGE FOR 1921-1922

(Abridged and Illustrated)



THE ANNUAL TUITION CHARGE FOR FOUR YEAR STUDENTS
REGISTERING FROM STATES OTHER THAN MASSACHUSETTS
WILL BE \$180, EFFECTIVE SEPTEMBER, 1922

THE COLLEGE PURPOSE.

“To be at home in all lands and all ages; to count nature a familiar acquaintance, and art an intimate friend; to gain a standard for the appreciation of other men's work and the criticism of one's own; to carry the keys of the world's library in one's pocket, and feel its resources behind one in whatever task he undertakes; to make hosts of friends among the men of one's own age who are to be leaders in all walks of life; to lose one's self in generous enthusiasms, and co-operate with others for common ends; to learn manners from students who are gentlemen, and form character under professors who are Christians; — these are the returns of a college for the best four years of one's life.” — Former President Hyde of Bowdoin College.

The endowment provided by Congress is for “the support and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and mechanic arts in such manner as the Legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.” — Act of Congress, July 2, 1862.

CALENDAR.

1921-22-23.

REGULAR AND TWO-YEAR COURSES.

1921.

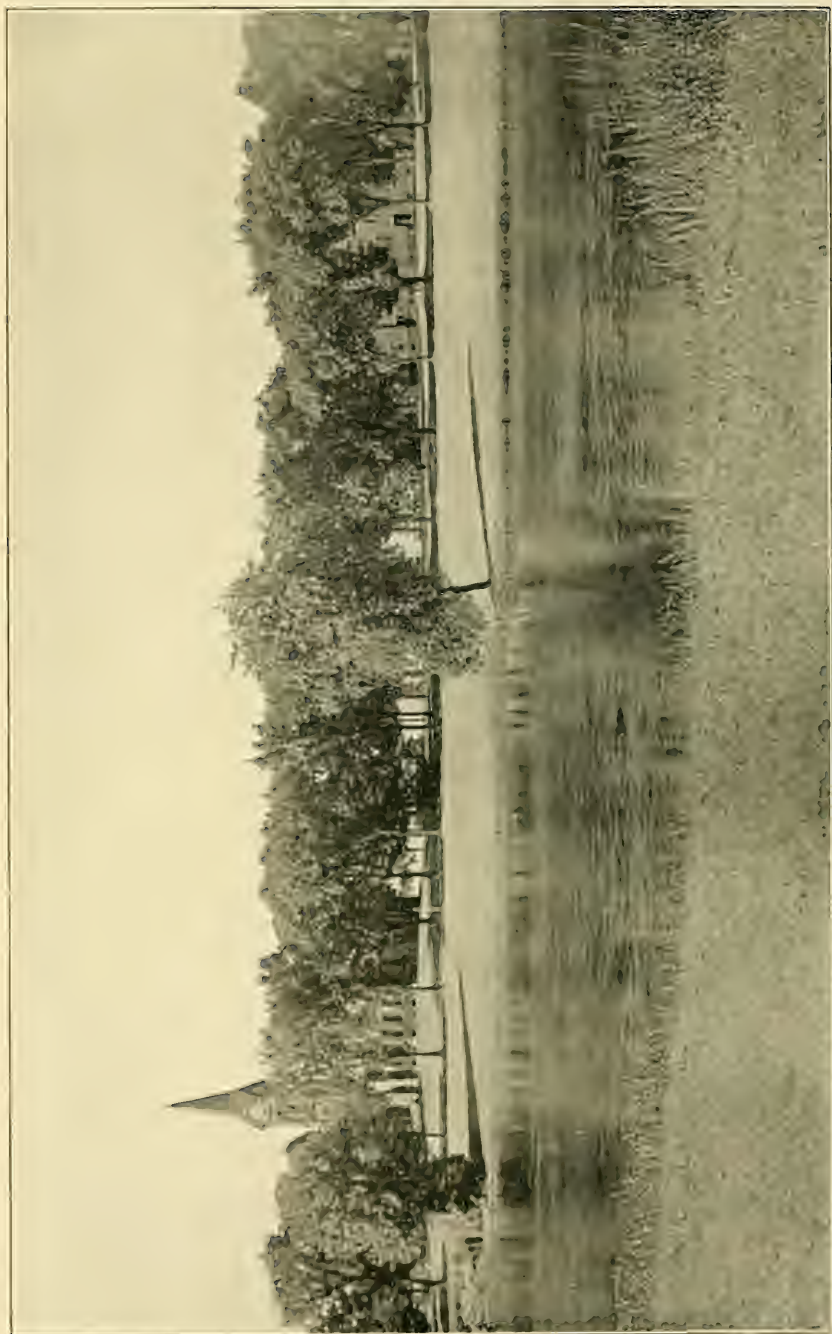
September 21-24, Wednesday-Saturday,	Entrance examinations.
September 28, Wednesday, 1.30 P.M.,	Fall term begins; assembly.
October 12, Wednesday,	Holiday — Columbus Day.
November 23-25, Wednesday, 12 M.-Friday, 1 P.M.,	Thanksgiving recess.
December 23, Friday, 5 P.M.,	Fall term ends.

1922.

January 2, Monday, 1 P.M.,	Winter term begins.
February 22, Wednesday,	Holiday — Washington's Birthday.
March 24, Friday, 5 P.M.,	Winter term ends.
April 3, Monday, 1 P.M.,	Spring term begins.
April 19, Wednesday,	Holiday — Patriots' Day.
May 30, Tuesday,	Holiday — Memorial Day.
June 24-27, Saturday-Tuesday,	Commencement.
June 29-July 1, Thursday-Saturday,	Entrance examinations.
September 20-23, Wednesday-Saturday,	Entrance examinations.
September 27, Wednesday, 1.30 P.M.,	Fall term begins; assembly.
October 12, Thursday,	Holiday — Columbus Day.
November 29-December 1, Wednesday, 12 M.-Friday 1 P.M.,	Thanksgiving recess.
December 22, Friday, 5 P.M.,	Fall term closes.

1923.

January 1, Monday, 1 P.M.,	Winter term begins.
February 22, Thursday,	Holiday — Washington's Birthday.
March 23, Friday, 5 P.M.,	Winter term ends.
April 2, Monday, 1 P.M.,	Spring term begins.
April 19, Thursday,	Holiday — Patriots' Day.
May 30, Wednesday,	Holiday — Memorial Day.
June 23-26, Saturday-Tuesday,	Commencement.
June 28-30, Thursday-Saturday,	Entrance examinations.
September 19-22, Wednesday-Saturday,	Entrance examinations.
September 26, Wednesday, 1.30 P.M.,	Fall term begins; assembly.



The Campus Pond and Library

FACTS FOR HIGH SCHOOL STUDENTS

A BRIEF HISTORY OF THE MASSACHUSETTS AGRICULTURAL COLLEGE.

The Morrill Act, passed by Congress on July 2, 1862, and signed by President Lincoln, provided for the donation of public lands to endow a college of agriculture and mechanic arts in each State of the Union.

Massachusetts received as her allotment 360,000 acres of land, and the moneys realized from the sale of this were divided between the Massachusetts Institute of Technology and a new independent college of agriculture to be controlled and supported by the State. This college was named the Massachusetts Agricultural College.

After prolonged discussion the new college was located at Amherst, "in the most picturesque portion of the renowned Connecticut Valley, — the garden spot of New England, — with scenery unsurpassed in beauty and cultivation in this or any other country."

The doors of the college were finally opened on October 2, 1867, to a freshman class of 47 members, the class of 1871, commonly known as the "Pioneer Class." In 1871 twenty-seven members of this class received degrees from the college.

One of the most momentous events of the early history was the Intercollegiate Regatta of American Colleges, held at Ingleside on the Connecticut River, July 21, 1871. Harvard, Brown, and M. A. C. participated in the race, and to the surprise of many, M. A. C. won by a dozen lengths at least, setting a new record for intercollegiate rowing. The M. A. C. crew finished one minute and forty-three and one-half seconds before the Harvard crew. Brown finished third.

From the event of the entrance of the pioneer class until the present time the college has had both prosperous and dark days, but has steadily gained in strength. The entering classes have grown as the years have passed by, more substantial buildings have been erected, and the State appropriations have constantly increased.

From the "Faculty of Four" — Pres. William S. Clark, Levi Stockbridge, Ebenezer Snell, and Henry H. Goodell — of the early days the staff has increased until it now numbers in its personnel 12 officers of general administration, 95 teachers, 45 Experiment Station and Control Service workers, 25 Extension Service administrators, 6 library officials and 21 other officers.

In 1867 the curriculum allowed but little variation from a fixed course of study; to-day a student is offered the choice of specialization in one of sixteen different departments. In 1867 courses in agriculture were of an elementary nature; to-day they are highly technical and specialized. Fifty years ago the study of agriculture was new and untried; to-day it demands the services of highly trained specialists. M. A. C. has trained many of the prominent agricultural leaders of the day.



A Campus Roadway

LOCATION AND EQUIPMENT.

One mile north of the center of the town of Amherst are located the 600 acres of land that compose the M. A. C. estate. Six miles farther north on Mount Toby is a demonstration forest of 755 acres.

The estate is roughly divided into the farm, the Experiment Station grounds, the orchards, the poultry plant, and the campus, which includes the site of the instruction buildings, dormitories, and the athletic field.

There are 23 substantial buildings, including 11 used for instruction purposes, 1 dormitory for women students and 2 for men, dining hall, Memorial Hall, library, infirmary buildings, Experiment Station buildings, the power plant, and the stock barns. There are fully as many frame buildings, making the total number about 50.

The Landscape Gardening Department has control of the landscape architecture of the grounds, and under its guidance the campus has been made a beauty spot which will compare favorably with any college campus.

The surrounding country affords opportunity for tramping and fishing, and for winter sports. The Holyoke Range, Mount Warner, Mount Toby, Mount Sugar Loaf, and the wide open stretch of the valley, with the beautiful Connecticut River winding its way along, make impressions that do not easily nor quickly pass from one's minds.

Amherst is 97 miles west of Boston, and may be reached by the Central Massachusetts Division of the Boston & Maine Railroad, or by the Central Vermont and Boston & Albany Railroads. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.

WHY GO TO COLLEGE?

The statement has been made that the strength of our Nation lies in the fact that every boy aspires to rise above the station of his father, and by virtue of our democratic opportunity is able to do so. Most boys and girls avail themselves of the opportunities offered by the public schools; but comparatively few young men and women continue on into college work. This is due largely to the allurements of positions in the commercial world. For a time it seems that the high school graduate who goes directly into business or industry has an advantage over the college-trained man or woman; but in the end the college graduate advances faster and farther than does one without a college training.

"An education is the safest investment; pays the highest interest; is the most readily converted into cash; never depreciates in value; never suffers from taxation; is never in danger from thieves; never ends in a lawsuit; is a gain for all eternity." A college training affords an opportunity, not only for the acquirement of knowledge, but also for the matching of that knowledge against real problems. Definite good is derived from new adjustments. A college man gets out of himself into the lives of others. The college brings together ideas and actions.

The values of a college training are varied, but enriching. A graduate from the Colorado School of Mines claims he got "a vision of life work instead of a job." Another from the University of Louisiana maintains that he was brought to "a realization that I was worth as much as the average man." A Boston University alumnus makes this statement: "When I entered I regarded it [college education] as a process of instilling facts in a young person's mind; when I graduated I knew this was a very small part, merely a means to an end, — the development of personality." From the University of Georgia comes this confession: "A self-unfoldment; a diversity of interests in life; a growth of ideals, of purposes and of judgment; strong convictions and friendships."

"If a college man has used the opportunities offered by the faculty, he has acquired a wide knowledge of history and a broad view of public affairs (as well as the technical knowledge he has obtained). If he has utilized the opportunities offered by his fellow students, he has acquired the democratic spirit, had gotten a grip on public opinion, and has had considerable experience in dealing with a large variety of men. All these things give him an advantage in the race, and statistics show that he is making good use of them."

The Massachusetts Agricultural College presents an opportunity for ambitious young men and women, on the completion of their high school work, to acquire at moderate cost a good education for those vocations which are connected with agriculture.

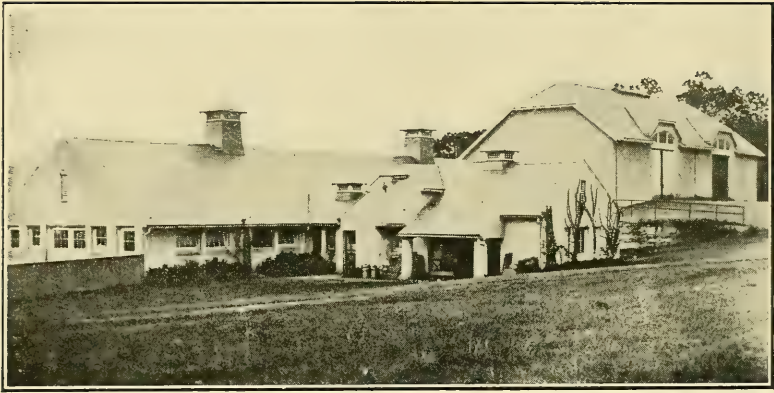


French Hall — Vegetable Gardening, Floriculture, and Forestry Building

AGRICULTURAL VOCATIONS.

The principal agricultural vocations for which the Massachusetts Agricultural College educates men and women are here listed.

1. PRODUCERS. — Foremen, managers, or owners of general farms, dairy farms, stock farms, poultry farms, fruit farms, market gardens, or other specialized farms.
2. OTHER PRACTICAL PURSUITS. — As superintendents of public parks and private estates, practical landscape gardeners, city foresters, florists.
3. RESEARCH AND OTHER SCIENTIFIC EXPERTS. — Chemists, entomologists, botanists, and specialists in marketing and other agricultural subjects employed by Federal, State or municipal governments, as well as by private business.
4. AGRICULTURAL COLLEGE AND SCHOOL TEACHERS. — Teachers and administrators of agricultural colleges, county agricultural high schools, and departments of agriculture in high schools.
5. AGRICULTURAL ADVISORS. — In connection with Federal, State and county Extension work, administrators and specialists are required in agriculture, home economics, and boys' and girls' club work.
6. COMMERCIAL WORK IN AGRICULTURE. — Agricultural experts associated with railroads, banks, the fertilizer, feed and farm machinery industries, managers of milk plants, canning factories, etc.
7. MISCELLANEOUS VOCATIONS. — Agricultural journalism, social service work in rural communities, work in connection with food preservation and distribution.



The Stock Barns

SUMMARY OF THE VOCATIONS OF M. A. C. GRADUATES OF THE CLASSES
OF 1905 TO 1920, INCLUSIVE, KNOWN TO BE ENGAGED IN AGRICULTURAL
PURSUITS.

July 1, 1921.

In practical agriculture:	
General farming,	180
Vegetable gardening,	9
Floriculture,	2
Professional agricultural pursuits:	
In public employ:	
Teaching:	
Agricultural colleges,	91
Agricultural schools,	34
Extension Service:	
County agents, etc.,	20
Experts, directors, etc.,	8
Research — Experiment Stations,	16
State Departments of Agriculture,	20
United States Department of Agriculture:	
Bureau of Markets,	7
Others,	30
Foreign agriculturalists,	3
Commercial operations:	
Landscape gardeners,	40
Foresters,	18
Chemists,	19
Other technical agricultural experts,	13
In agricultural business,	68
In miscellaneous agricultural pursuits,	15
Total,	593

Total number of graduates of the classes of 1905 to 1920, inclusive, whose vocations were known, 848

ADMISSION.

A. APPLICATION FOR ADMISSION.

Correspondence concerning admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of character, which, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege at least one month before the date of the examination. Blanks for such application may be obtained by addressing the registrar of the college. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

B. MODES OF ADMISSION.

Students are admitted to the freshman class either upon certificate or upon examination. No diploma from a secondary school will be accepted.

CERTIFICATES. — Certificates will be received from those schools in New England which have been approved by the New England College Entrance Certificate Board. Principals of schools in New England who desire the certificate privilege should address the secretary of the Board, Professor Frank W. Nicolson, Wesleyan University, Middletown, Conn. Certificates from schools outside of New England may be received if those schools are on the approved list of the leading colleges of the section in which the school in question is located.

The credentials of the Board of Regents of the State of New York are accepted as satisfying the entrance requirements of this college when offered subject for subject.

Certificates in order to be accepted must present in the prescribed and restrictive elective groups at least three of the necessary fourteen and one-half credits. It is to be understood, however, that responsibility for certification in either elementary French, elementary German, English 1 or English 2, Latin A, Greek A or algebra must be assumed by one school, if the candidate has received his preparation in any one subject named above in more than one school. Subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

EXAMINATIONS. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.

Entrance examination for admission to the Massachusetts Agricultural College will be held at the following centers: —

In June, Amherst, Department of Physics building.
Massachusetts Institute of Technology,
Cambridge, Mass.
Worcester, Horticultural Hall.

In September, Amherst, Department of Physics building.

Please note that September examinations are held in Amherst only.

Schedule for Entrance Examinations, June 29–July 1, inclusive, 1922. — The examinations in June will follow this schedule: —

First Day.

7.45 A.M. Registration.¹
8.00 A.M. Plane geometry.
10.00 A.M. Chemistry.
11.30 A.M. Botany.
2.00 P.M. Solid geometry.
4.00 P.M. Physics.

Second Day.

8.00 A.M. English 1 and 2.
11.00 A.M. Algebra.
2.00 P.M. History (ancient; medieval and modern; English; general; United States and civics).

Third Day.

8.00 A.M. French, German, Spanish, required and elective.
1.00 P.M. Latin, elementary, intermediate and advanced, and all one-half credit electives, except those already noted.

Schedule for Entrance Examinations in September. — In September, 1922, the examinations will be given September 20–23, inclusive, and will follow the order indicated below: —

First Day.

1.00 P.M. Registration.¹
1.15–5.00 P.M. Greek, elementary and intermediate.

Second Day.

8.00 A.M. Plane geometry.
10.00 A.M. Chemistry.
11.30 A.M. Botany.
2.00 P.M. Solid geometry.
4.00 P.M. Physics.

¹ Candidates who have no examination at the time set for registration may register at the time of their first examination should they so desire.

Third Day.

- 8.00 A.M. English 1 and 2.
 11.00 A.M. Algebra.
 2.00 P.M. History (ancient; medieval and modern; English; general; United States and civics).

Fourth Day.

- 8.00 A.M. French, German, Spanish, required and elective.
 1.00 P.M. Latin, elementary, intermediate and advanced, and all one-half credit electives, except those already noted.

C. REQUIREMENTS FOR ADMISSION.

The requirements for admission are based on the completion of a four-year high school course, or its equivalent, and are stated in terms of units. The term unit means the equivalent of at least four recitations a week for a school year.

Fourteen and one-half units must be offered for admission in accordance with the entrance requirements as stated below. Entrance credits gained either by certificate or by examination will hold good for one year.

Entrance Requirements.

1. *Prescribed.* — The following units are prescribed: —

English 1,	1½
English 2,	1½
A foreign language,	2
Algebra,	1½
Plane geometry,	1
	<hr/>
	7½

2. *Restricted Electives.* — Three units to be selected from —

Science,	1, 2 or 3
History (American history and civics included),	1, 2 or 3
A second foreign language,	2 or 3
Additional work in first foreign language,	1 or 2.

3. *Free Margin.* — Free margin of four units to consist of any substantial work (including agriculture,¹ general science and a fourth year of English) for which credit of not less than one-half unit earned in one year is given toward a secondary school diploma.

Units presented in the free margin group are not to be offered by examination or by certificate, but presented by submitting a principal's statement to the effect that such units have been earned in a secondary school, and have been credited toward a diploma issued by such a school.

¹ See page 15 for details.

4. One unit of history must be offered in either the restricted electives or the free margin.

5. If elementary algebra and plane geometry are counted as three units, the total requirement will be fifteen units.

6. Both the credits under the prescribed group and the restricted elective group must be presented either by certificate from an approved school or by examination, or by a combination of both.

The following is a list of subjects in which the entrance credits must be offered in the prescribed and restricted elective groups:—

Mathematics and Science.

Botany, ¹	. . . . .	$\frac{1}{2}$ or 1
Chemistry, ¹	. . . . .	1
Algebra,	. . . . .	$1\frac{1}{2}$
Plane geometry,	. . . . .	1
Solid geometry,	. . . . .	$\frac{1}{2}$
Trigonometry,	. . . . .	$\frac{1}{2}$
Physics, ¹	. . . . .	1
Geology,	. . . . .	$\frac{1}{2}$
Physical geography,	. . . . .	$\frac{1}{2}$
Physiology,	. . . . .	$\frac{1}{2}$
Zoölogy, ¹	. . . . .	$\frac{1}{2}$

History.

Ancient,	. . . . .	1
Medieval and modern,	. . . . .	1
English,	. . . . .	1
General,	. . . . .	1
United States and civics,	. . . . .	1

English.

English 1,	. . . . .	$1\frac{1}{2}$
English 2,	. . . . .	$1\frac{1}{2}$

Foreign Language.

Elementary French,	. . . . .	2
Elementary German,	. . . . .	2
Elementary Spanish,	. . . . .	2
Elementary Latin,	. . . . .	2
Elementary Greek, ²	. . . . .	2
Intermediate French,	. . . . .	1
Intermediate German,	. . . . .	1
Intermediate Spanish,	. . . . .	1
Intermediate Latin,	. . . . .	1
Intermediate Greek, ²	. . . . .	1
Advanced French,	. . . . .	1
Advanced German,	. . . . .	1
Advanced Spanish,	. . . . .	1
Advanced Latin,	. . . . .	1

No applicant deficient in both algebra and plane geometry will be admitted.

¹ Note-book required as part of the preparation will be credited as part of the examination.

² Examination in September only.

PRESENTATION OF NOTE-BOOKS. — The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 1, page 14).

Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificates should not present note-books; but their certificates must state that note-books have been satisfactorily completed.

D. STATEMENT OF PREPARATION REQUIRED FOR ADMISSION.

AGRICULTURE. — Entrance credit in agriculture is granted on the following basis: —

I. The Massachusetts Agricultural College accepts a maximum of four credits in agriculture from any secondary or county agricultural high school in Massachusetts offering work in that subject, provided evidence of such work having been done is submitted on a principal's statement, as is indicated in the "free margin" group.

II. In high schools organizing agricultural club work under the supervision and rules of the junior extension service of the college, one credit is granted for each full year of work performed under the following plan: —

Work of the Winter Term. — (a) The study of textbooks such as are suitable for secondary school instruction in agriculture.

(b) Course of Study: A general outline of suggested topics for study.

(c) Visits by a representative of the Massachusetts Agricultural College for observation, counsel and advice in regard to kind and amount of work being done in agriculture.

(d) Formation of an agricultural club with officers from among its own members, meeting once a month under local supervision of some one authorized to act for the school authorities.

Work of the Spring Term. — Same in general form as winter term.

Work of the Summer Term. — An approved project conforming to the rules of some one or more of the agricultural clubs of the junior extension service of the Massachusetts Agricultural College.

Work of the Fall Term. — (a) An exhibit of work.

(b) Reports and story of achievement submitted to the junior extension service of the college.

The maximum number of credits in agriculture is four.

BOTANY. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary textbook study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Stevens' "Introduction to Botany" and Bergen & Davis' "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit, and this note-book must be pre-

sented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

CHEMISTRY. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from any standard textbook, with laboratory work on the properties of the common elements and their simpler compounds. No particular work is prescribed. The keeping of a note-book is required.

MATHEMATICS. — (a) *Required*. — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents, the formulas for the n th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good textbooks, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(b) *Elective*. — Solid Geometry: The usual theorems and constructions of good textbooks, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

PHYSICS. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work must consist of both class-room work and laboratory practice. The work covered in the class-room should be equal to that outlined in Hall & Bergen's "Textbook of Physics" or Millikan & Gale; the laboratory work should represent at least thirty-

five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

PHYSIOLOGY. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body; Briefer Course."

ZOOLOGY, PHYSICAL GEOGRAPHY, GEOLOGY. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis' "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, textbooks entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Textbook in General Zoölogy." For geology, A. P. Brigham's "A Textbook of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present note-books, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

HISTORY. — The required unit must be offered in either ancient history, medieval and modern history, English history, general history, or United States history and civics. Either one, two or three elective units in any of the historical subjects here named may be offered, provided that no unit be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good textbooks, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on outline maps.

To indicate in a general way the character of the textbook work expected, the texts of the following authors are suggested: Botsford, Morey or Myers, in ancient history (to 814 A.D.); Adams, West or Myers, in medieval history; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery, in United States history and civics.

ENGLISH. — The study of English in school has two main objects, which should be considered of equal importance: (1) command of correct and clear

English, spoken and written; (2) ability to read with accuracy, intelligence and appreciation, and the development of the habit of reading good literature with enjoyment.

(1) *Grammar and Composition* (One and One-half Units). — The first object requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, sentences and paragraphs should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise letter-writing, narration, description and easy exposition and argument. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

(2) *Literature* (One and One-half Units). — The second object is sought by means of two lists of books, headed, respectively, "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud and encouraged to commit to memory some of the more notable passages both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads and with their place in literary history.

A. *Books for Reading*. — The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

The books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except that for any book in Group I a book from any other may be substituted.

GROUP I. CLASSICS IN TRANSLATION.

The "Old Testament," at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther.

The "Odyssey," with the omission, if desired, of Books I-V, XV and XVI.

The "Æneid."

The "Odyssey" and the "Æneid" should be read in English translations of recognized literary excellence.

GROUP II. DRAMA.

Shakespeare: "Merchant of Venice," "As You Like It," "Julius Cæsar."

GROUP III. PROSE FICTION.

Dickens: "A Tale of Two Cities."
 George Eliot: "Silas Marner."
 Scott: "Quentin Durward."
 Hawthorne: "The House of the Seven Gables."

GROUP IV. ESSAYS, BIOGRAPHY, ETC.

Addison and Steele: "The Sir Roger de Coverley Papers."
 Irving: "The Sketch Book," selections covering about 175 pages.
 Macaulay: "Lord Clive."
 Parkman: "The Oregon Trail."

GROUP V. POETRY.

Tennyson: "The Coming of Arthur," "Gareth and Lynette," "Lancelot and Elaine," "The Passing of Arthur."
 Browning: "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Herve Riel," "Pheidippides," "My Last Duchess," "Up at a Villa—Down in the City," "The Italian in England," "The Patriot," "The Pied Piper," "De Gustibus," "Instans Tyrannus."
 Scott: "The Lady of the Lake."
 Coleridge: "The Ancient Mariner."
 Arnold: "Sohrab and Rustum."

B. Books for Study.—This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. The books provided for study are arranged in four groups, from each of which one selection is to be made.

The books provided for study are arranged in four groups, from each of which one selection is to be made.

GROUP I. DRAMA.

Shakespeare: "Macbeth," "Hamlet."

GROUP II. POETRY.

Milton: "L'Allegro," "Il Penseroso," "Comus."
 Book IV of Palgrave's "Golden Treasury" (first series), with special attention to Wordsworth, Keats and Shelley.

GROUP III. ORATORY.

Burke: "Speech on Conciliation with America."
 Washington's "Farewell Address," Webster's "First Bunker Hill Oration," and Lincoln's "Gettysburg Address."

GROUP IV. ESSAYS.

Macaulay: "Life of Johnson."
 Carlyle: "Essay on Burns," with a brief selection from Burns' poems.

Examination. — However accurate in subject-matter, no paper will be considered satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which will be on grammar and composition, and the other on literature.

In grammar and composition, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors. The main test in composition will consist of one or more essays, developing a theme through several paragraphs; the subjects will be drawn from the books read, from the candidate's other studies and from his personal knowledge and experience quite apart from reading.

The examination in literature will include: —

(a) General questions designed to test such a knowledge and appreciation of literature as may be gained by fulfilling the requirements defined under "A, Reading," above.

(b) A test on the books prescribed for study, which will consist of questions upon their content and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their works and the periods of literary history to which they belong.

FRENCH. — Elementary: The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a third credit unit in French as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in French will be given unless the candidate has presented elementary French on certificate, or has written the examination in elementary French.

No examination for a fourth credit in French will be given unless the candidate has presented both elementary and intermediate French upon certificate, or has written the examination in both elementary and intermediate French.

GERMAN. — Elementary: The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-year requirements).

Third and fourth year German (elective subjects for admission). — For a third credit unit in German as an elective subject for entrance, when required

units have been offered in German, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in German will be given unless the candidate has presented elementary German upon certificate, or has written the examination in elementary German.

No examination for a fourth credit in German will be given unless the candidate has presented both elementary and intermediate German upon certificate, or has written the examination for both elementary and intermediate German.

SPANISH. — *Elementary:* The necessary preparation for this examination is stated in the description of the two-year course in elementary Spanish recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year Spanish (elective subjects for admission). — For a third credit unit in Spanish as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in Spanish will be given unless the candidate has presented elementary Spanish on certificate, or has written the examination in elementary Spanish.

No examination for a fourth credit in Spanish will be given unless the candidate has presented both elementary and intermediate Spanish upon certificate, or has written the examination in both elementary and intermediate Spanish.

GREEK. — *Elementary.* — Greek grammar and composition: Translation into Greek of short sentences illustrating common principles of syntax.

The examination in grammar and prose composition will be based on the first four books of Xenophon's "Anabasis."

Intermediate. — Homer's "Iliad," Books I and II (omitting Book II, 494 to end), and the Homeric forms, constructions, idioms and prosody.

Prose composition, consisting of continuous prose based on Xenophon, and other Attic prose of similar difficulty.

Translation of passages of Homer at sight.

The examinations in Greek, elementary and intermediate, will be given in September only.

LATIN. — *Elementary.* — Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (a) the translation of a passage or passages taken from Cæsar's "Gallic War," covering at least four books, and (b) the translation of passages of Latin prose at sight.

Intermediate. — Cicero (third oration "Against Catiline" and the orations "For Archias" and "For Marcellus") and sight translation of prose.

Advanced. — Vergil (*Æneid*, II, III and VI) and sight translation of poetry.

E. ADMISSION TO ADVANCED STANDING.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials:—

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.
5. A statement from the proper officer, giving the total number of credits required for graduation by the institution from which the applicant is transferring, and, of this total, the number that the applicant has satisfactorily completed at the time of transfer.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

F. OTHER INFORMATION ABOUT ENTRANCE.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)

2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.

3. To matriculate, candidates must offer twelve and one-half of the fourteen and one-half units required for admission, and will be conditioned in those subjects not passed. At least five and one-half credits must be in the prescribed group. No candidate deficient in both algebra and plane geometry will be admitted.

4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination during the first week of the second term. (2) Second entrance condition examination before the beginning of the period of final examinations of the second term, upon the payment of a fee of \$5 to the treasurer.

5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.

6. Examinations in part of the subjects required for entrance may be taken one year before entering college.

7. For information concerning expenses, scholarships, etc., see "General Information."

8. Application for admission as a "Special Student" should be made to the Dean.

COURSES OF INSTRUCTION.

TABLE OF FRESHMAN AND SOPHOMORE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

FRESHMAN YEAR.

FIRST TERM.

All work required.

SUBJECT.	Courses and Numbers.	Credit Hours per Week.
Chemistry,	Chemistry 1 or 4,	3
Algebra,	Mathematics 1,	5
Language,	French or German 1 or 4,	3
English,	English 1,	3
Agriculture,	Agronomy 1, Horticulture 1,	3
Military (for men),	Military 1,	3
Microbiology (for women),	Microbiology 1,	3
Hygiene,	Physical Education 1,	1
Public speaking,	Public Speaking 1 (one-third of the class),	1

College life (attendance without credit).

SECOND TERM.

Chemistry,	Chemistry 2 or 5,	3
Algebra,	Mathematics 2,	2
Trigonometry,	Mathematics 5,	3
Language,	French or German 2 or 5,	3
English,	English 2,	3
Agriculture,	Poultry 1, Animal Husbandry 1,	3
Military (for men),	Military 2,	3
Geology (for men),	Geology 2,	2
Rural home life (for women),	Rural Home Life 2,	2
Public speaking,	Public Speaking 1 (one-third of class),	1

College life (attendance without credit).

FRESHMAN YEAR — *Concluded.*

THIRD TERM.

SUBJECT.	Courses and Numbers.	Credit Hours per Week.
Chemistry,	Chemistry 3 or 6,	3
Solid geometry,	Mathematics 3,	3
Mensuration (for men),	Mathematics 6,	2
Language,	French or German 3 or 6,	3
English,	English 3,	3
Botany,	Botany 3,	3
Military (for men),	Military 3,	3
Microbiology (for women),	Microbiology 3,	2
Rural home life (for women),	Rural Home Life 3,	3
Recreation,	Physical Education 3,	1
Public speaking,	Public Speaking 1 (one-third of class),	1

College life (attendance without credit).



Freshman-Sophomore Sixty Man Rope Pull

SOPHOMORE YEAR.

FIRST TERM.

SUBJECT.	Course Number.	Class Hours.	Two Hour Laboratory Periods.	Credit Hours per Week.
<i>Required.</i>				
Physics,	25	3	1	4
Zoölogy,	25	2	2	4
Botany,	25	1	2	3
English,	25	2	-	2
Military (for men),	25	1	2	3
Microbiology (for women),	25	2	-	2
Total required,	-	-	-	17
<i>Elective.</i>				
Chemistry,	25	1	2	3
French,	25 or 28	3	-	3
German,	25 or 28	3	-	3
Drawing,	25	-	3	3
Animal husbandry,	25	2	1	3
Rural engineering,	25	-	2	2
Rural home life,	25	1	2	3

Minimum credit for first term, 18.

Maximum credit for first term, 21.

SECOND TERM.

<i>Required.</i>				
Physics,	26	2	1	3
Agricultural economics,	26	5	-	5
English,	26	2	-	2
Military (for men),	26	1	2	3
Total required,	-	-	-	12
<i>Elective.</i>				
Chemistry,	26	1	2	3
French,	26 or 29	3	-	3
German,	26 or 29	3	-	3
Mathematics,	26	2	-	2
Drawing,	26	-	3	3
Entomology,	26	3	-	3
Animal husbandry,	26	2	1	3
Rural engineering,	26	-	2	2
Botany,	26	1	2	3
Economic sociology,	26	5	-	5
Rural home life (for women),	26	1	2	3

Minimum credit for second term, 18.

Maximum credit for second term, 20.

SOPHOMORE YEAR — *Concluded.*

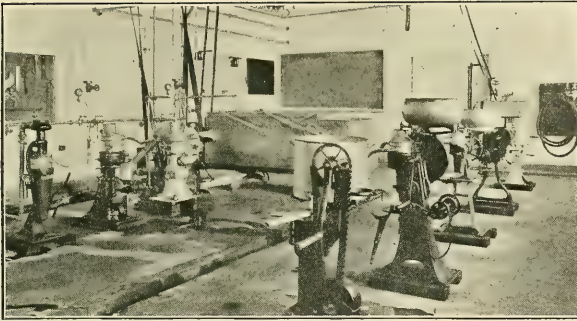
THIRD TERM.

SUBJECT.	Course Number.	Class Hours.	Two Hour Laboratory Periods.	Credit Hours per Week.
<i>Required.</i>				
Rural sociology,	27	3	-	3
Agronomy,	27	4	1	5
English,	27	2	-	2
Military (for men),	27	1	2	3
Microbiology (for women),	27	2	-	2
Physical education, ¹	26	-	1	1
Total required,	-	-	-	15
<i>Elective.</i>				
Botany,	27	1	2	3
Chemistry,	27	1	4	5
Chemistry,	6	3	2	5
French,	27 or 30	3	-	3
German,	27 or 30	3	-	3
Mathematics,	27	-	3	3
Drawing,	27	-	3	3
Entomology,	27	-	2	2
Geology,	27	3	2	5
Physics,	27	4	1	5
Horticulture,	27	2	1	3
Zoölogy,	27	1	2	3
Rural home life (for women),	27	1	2	3

Minimum credit for third term, 19.

Maximum credit for third term, 22.

¹ Credit for Physical Education 2 and 3 given in third term.



Interior of a Dairy Laboratory

MAJORS: JUNIOR AND SENIOR YEARS.

GENERAL STATEMENT.

A major consists of 45 credit hours of correlated work, which is arranged by the student and his adviser.

The list of courses found under each major on subsequent pages should not be considered as necessarily a rigid program to be followed. The heads of departments have suggested this series of courses as the best for the average man majoring in their departments. Advisers may, however, make modifications to suit the particular needs of the student, provided these modifications conform precisely to the class schedule as published for the year.

RULES GOVERNING MAJORS.

RULE 1. *Election.* — Each student, before the first term of his junior year, shall elect a major subject from the list of majors given below; and this major shall consist of 45 credit hours of correlated work.

RULE 2. *Minimum Credits.* — The minimum number of credits for graduation shall be 237 credit hours, inclusive of military drill and physical education.

RULE 3. *Maximum Credits.* — The maximum number of credits for any term of the junior or senior year shall be 22; the minimum shall be 19.

RULE 4. *Humanities and Rural Social Science.* — A minimum of 18 credit hours in the Divisions of the Humanities and Rural Social Science will be required of all students during their junior and senior years, with the following restriction: that a minimum of 5 credit hours will be required in each of the divisions.

RULE 5. *Advisers.* — The work of each junior and senior will be under the immediate supervision of an instructor designated as major adviser. Ordinarily, the major adviser will be the head of the department in which the stu-

dent elects his major. The adviser has full authority to prescribe the student's work up to 45 hours. He will, however, so far as practicable, recognize the individual needs of the student. It is also expected that students will seek the counsel of the adviser with respect to the remaining courses required for graduation.

RULE 6. *Free Electives.* — Each student during his junior and senior years is required to take 45 hours in his major and also 18 hours in the Divisions of the Humanities and Rural Social Science, making a total of 63 hours (but see Rule 4). He is allowed free choice of courses to complete his required hours.

RULE 7. *Registration.* — No junior or senior shall register until his major course of study is approved by his adviser.

(1) Course cards for recording the election of majors will be issued from the registrar's office three weeks before the close of each term.

(2) This card must be submitted by each student to his major adviser, who will lay out the course for the succeeding term and countersign the card.

(3) Each course card must be filled out, giving the name of student, his college address, the name of parent or guardian, and the student's home address. When the major courses have been entered on this card, and the hours of free elections added by the student, the card must be returned to the registrar one week before the beginning of the final examination period.

RULE 8. *Changes.* — Applications for changes may be made to the dean in writing at any time; when approved by him and by the committee on scholarship, they become operative at the beginning of the term following, provided that no change in the selection of a major may be made by any student after registration day of his senior year.

MAJOR SUBJECTS.

Agronomy.	Vegetable gardening.
Animal husbandry.	Economic botany.
Dairying.	Agricultural chemistry.
Farm management.	Entomology.
Poultry husbandry.	Microbiology.
Floriculture.	Agricultural economics.
Forestry.	Agricultural education.
Landscape gardening.	Rural sociology.
Pomology.	

SUPPORTING SUBJECTS.

Rural engineering.	Horticultural subjects.
Mathematics and civil engineering.	Physics.
Veterinary science.	Zoölogy and geology.
Language and literature.	Rural home life (for women).



Draper Hall — Dining Hall

DESCRIPTION OF COURSES.

DIVISION OF AGRICULTURE.

Professor FOORD.

[Heavy-faced Roman numerals indicate the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

AGRICULTURE AND HORTICULTURE. Freshmen. This course continuing through the year constitutes the required elementary work dealing with the foundations of the subjects of live stock and the crops of the field, orchard and the garden. Several departments collaborate in giving the work; three credits each term are assigned to this course. For a description of the work see —

Agronomy 1, **I**.
 Animal Husbandry 1, **II**.
 Horticulture 1, **I**.
 Poultry Husbandry 1, **II**.

Agronomy.

Professor BEAUMONT, Assistant Professor MICHELS, Mr. THELIN, Mr. THAYER, Mr. LANPHEAR.

The courses in agronomy are designed to present the fundamental knowledge concerning the soil and the principal products of the field. The basic course in soils is required of all students. The electives purpose to meet the needs of

those specializing in soils and field crops and other specialized fields including both pure and applied science.

The laboratories for soils and fertilizers include one for elementary work, supplied with locker equipment for 200 students, and one for advanced work, accommodating 80 students. These laboratories are equipped with steam and electric ovens, balances, centrifuge, microscopes and other apparatus necessary for a study of soils and fertilizers. Storerooms, stock rooms, and balance rooms are conveniently near the laboratories. There is also a workroom attached, equipped with power machinery for grinding soils, fodders and the like.

The crops' laboratories include one for seed study, with lockers for 50 students, and a laboratory for the study of cereals, forage crops, roots, etc., with lockers for 64 students. The equipment of these laboratories includes steam ovens, constant temperature electric ovens, ovens for seed germination, Brown-Duval moisture apparatus, balances, microscopes, and collections of seeds, grasses, tubers, weeds, etc. A balance room, root cellar and two store-rooms, one of which is mouse-proof, are also used for crop work.

A modern steam-heated greenhouse 25 by 35 feet, used for work in soils and crops, is a valuable part of the equipment. Near the greenhouse is a crop garden on which different varieties of corn, grasses, clovers, etc., are grown for demonstration purposes, and as a source of material for class work. In addition, the general college farm of 250 acres is used for field study in soils and crops, and as a source of material.

Required Courses.

1. I.	Agronomy, elementary,	Freshmen.
27. III.	Soils and Fertilizers,	Sophomores.

Elective Courses.

50. I.	Field and Forage Crops,	Juniors.
51. III.	Advanced Field Crops,	Juniors.
75. I.	Advanced Soils,	Seniors.
77. II.	Manures and Fertilizers,	Seniors.
78. II.	Breeding of Field Crops,	Seniors.

Animal Husbandry.

Professor SALISBURY, Assistant Professor RICE, Assistant Professor GLATFELTER, Mr. THAYER.

It is the purpose of this department to present comprehensive information on the subject of animal husbandry. The first courses are studies of the breeds, types and market classes of live stock. These are followed by courses in judging, breeding and management.

The department is equipped with an excellent laboratory, Grinnell Arena, which has a seating capacity of 180. The equipment for classroom instruction includes upwards of 125 head of dairy cattle which are superior representatives

of Jersey, Guernsey, Ayrshire and Holstein breeds; considerable numbers of Berkshire and Chester White pigs; pure-bred Percherons; and several work teams of various types. The department has a collection of plaster of Paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine; and a set of over 250 lantern slides portraying the leading prize-winning producing and breeding animals of the principal breeds of horses, cattle, sheep and swine. There is also a collection of the different foodstuffs available for the use of New England farmers. All this equipment is being added to from time to time as funds are available.

Required Courses.

1. II.	Animal Husbandry, elementary,	Freshmen.
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Elective Courses.

25. I.	26. II.	Types and Breeds of Live Stock,	Sophomores.
50. I.	51. II.	Feeds and Feeding,	Juniors.
52. III.		Advanced Stock Judging,	Juniors.
53. III.		Principles of Breeding,	Juniors.
75. I.		Live-stock Management,	Seniors.
78. II.		Herd and Stud-book Study,	Seniors.
79. III.		Dairy, Cattle and Milk Production,	Seniors.
81. II.	82. III.	Dairy and Animal Husbandry, Seminar,	Seniors.

Dairying.

Professor LOCKWOOD, Professor JUDKINS, Assistant Professor YAXIS, Mr. PENDLETON, Mr. SMITH.

The dairy manufactures building is new, well lighted and of sanitary construction. It is designed and equipped especially for teaching dairy manufactures. The equipment includes all kinds of machinery that are considered essential to the proper handling of milk and the making of cream, butter, ice cream and soft cheeses.

Course 77 is for students who desire a general idea of dairy work and manufacturing processes. Part of the courses are arranged to give instruction in general dairy work as associated with Massachusetts agriculture; part are arranged to give to a smaller group of students more complete work in dairy manufactures.

Elective Courses.

50. I.	Milk and Milk Composition,	Juniors.
51. III.	Butter Making,	Juniors.
52. III.	Judging Dairy Products,	Juniors.
75. II.	Market Milk,	Seniors.
76. III.	Milk Products,	Seniors.
77. I.	Dairying — General,	Seniors.

Farm Management.

Professor FOORD, Assistant Professor ABELL.

The purpose of the courses in this department is to present various considerations of farming as a business. This involves a knowledge of the cost of production and the profit from the different enterprises such as dairy, poultry or orchard; a study of the enterprises, and the relative amounts of each that will give the best use of labor and equipment on the farm under consideration.

The college farm of 250 acres is under the general supervision of the Department of Farm Management, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied. The offices of the department are in Stockbridge Hall.

Elective Courses.

75. I.	Farm Accounts and Cost Accounting,	.	.	.	Seniors.
76. I.	Farm Management,	.	.	.	Seniors.
77. III.	Farm Management,	.	.	.	Seniors.
78. II. 79. III.	Seminar,	.	.	.	Seniors.

Poultry Husbandry.

Professor GRAHAM, Professor SANCTUARY, Dr. GOODALE, Assistant Professor BANTA, Mr. RYAN.

The introductory courses (1, 50, 51, 52, 53, 54) give a knowledge of the general routine of elementary poultry keeping. The advanced studies prepare men for the successful operation of poultry plants, either as owners or managers. Graduate work, preparation for further teaching, extension or investigation.

The poultry plant consists of 8 acres of land sloping gently to the west. The buildings consist of three incubator cellars equipped with a number of lamp incubators and two mammoth machines with a total capacity of 9,000 eggs; a pipe brooder house (open pipe system) and 40 colony brooder houses which give a brooding capacity for 7,000 chicks, the equipment for these houses including a large variety of coal-stove brooders and kerosene hovers; a long laying house 14 by 180 feet, which accommodates 500 layers, furnishing facilities for student work in pen management, utility and fancy judging, etc.; and a laboratory 14 by 80, for killing, picking, drawing, trussing, packing, crate fattening and cramming. The fattening equipment consists of a modern

sanitary all-steel battery with 16 compartments and 10 wooden crates, accommodating, altogether, 350 birds. There are also a storage building, 28 by 64 feet, for root cellar, poultry carpentry, poultry mechanics, feed room and storage; an experimental breeding house, 18 by 60; a combination laying, testing and breeding house, 18 by 72, for experimental purposes; a model laying house, 18 by 30, for 100 hens, and a house 20 by 40, for 200 hens. The six old experiment-station houses, each 12 by 18 feet, are used as special mating and overflow pens. The total capacity for laying hens is 1,600. A manure shed 14 by 18 feet; an oil and tool house 10 by 12; an incinerator 10 by 10; and two backyard model poultry houses 8 by 10 and 8 by 8 give a total of 76 buildings, not including a pheasant run, 16 roosting sheds 10 by 10, and numerous small coops for natural incubation and brooding.

Required Course.

1. I.	Poultry Husbandry, elementary,	Freshmen.
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Elective Courses.

50. I.	Elements of Poultry Culture,	Juniors.
51. I.	Poultry Practice Work,	Juniors.
52. II.	Elements of Poultry Culture,	Juniors.
53. III.	Incubation and Brooding,	Juniors.
54. III.	Pen Management,	Juniors.
55. I, II, and III.	Investigational Work,	Seniors.
75. II.	Poultry Management,	Seniors.
76. I.	Advanced Poultry Judging,	Seniors.
77. I.	Market Poultry and Poultry Products,	Seniors.
78. III.	Farm Poultry, general,	Seniors.



A Class in Agronomy

Rural Engineering.

Professor GUNNESS, Assistant Professor STRAHAN, Mr. PUSHEE, Mr. NEWLON.

The courses in rural engineering are planned to give a working knowledge of those phases of engineering which apply directly to the farm. It is expected that the student will acquire a clear understanding of modern farm practice as it relates to permanent improvements of the farm and the farmstead, and in the selection and use of farm equipment.

This department has an office and the use of a lecture room in Stockbridge Hall. The work on farm structures is given in the large drawing room in the same building. This room is fitted with thirty drawing tables. Models and blue prints are available for the study of farm buildings. A set of post molds and a machine for making cement tile afford opportunity for practical work with cement.

The rural engineering shop is a one-story structure 68 by 126 feet. The carpenter shop in this building is fitted with benches fully equipped with tools for each student. The general repair shop is equipped with forges, benches, a drill press and grinders. The laboratory for farm machinery and farm motors is equipped with a complete line of field machines, gasoline engines, tractors and pumps. A complete assortment of engine accessories, consisting of carburetors, magnetos, etc., is available for thorough instruction in gas engines. A small dynamo and switchboard are used in the study of farm-lighting systems. The work on the small field machines is given in the basement of Stockbridge Hall, and the work on steam engines and steam heating is given in Flint Laboratory.

Elective Courses.

25. I and III.	Carpentry,	Sophomores.
26. II.	Repair of Farm Equipment,	Sophomores.
52. III.	Farm Engineering,	Juniors.
75. I.	Farm Structures,	Seniors.
78. II and III.	Farm Machinery,	Seniors.
79. III.	Drainage and Irrigation Engineering,	Seniors.
80. II.	Farm Building Design,	Seniors.

DIVISION OF HORTICULTURE.

Professor WAUGH.

[Heavy-faced Roman numerals indicate the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Floriculture.

Professor THAYER.

The courses in floriculture are intended to present a general knowledge of all phases of greenhouse design, construction, heating and management, the culture of florists' crops (under glass and in the field), floral decoration and arrangement. The department aims to train students so that they may take up commercial floriculture (either in the growing or retail business) and the management of conservatories on private estates, in parks and cemeteries.

The department is especially well equipped for the teaching work, probably being surpassed in no other agricultural college. French Hall, with its laboratories, classrooms and offices, furnishes excellent facilities for the purposes of instruction. The glass area of the department consists of approximately 20,000 square feet, divided as follows: French Hall range of 7,200 square feet, a durable, practical, commercial range composed of palm and fern, violet, carnation, rose and students' houses; the old Durfee range of 7,400 square feet, devoted to the growing of decorative, conservatory and bedding plants and chrysanthemums; one house of 3,200 square feet, suitable for propagating work and general plant culture; and approximately 2,200 square feet in cold frames and hotbeds.

In addition, the department has 2 acres of land used for the summer culture of carnations, violets, gladioli, dahlias, sweet peas, bedding plants, etc. This also includes a small garden of about 4,700 square feet devoted to the culture of annuals. A large collection of biennials and herbaceous perennials is maintained and is being enlarged from year to year; at the present time the collection consists of several hundred species and varieties, and provides an excellent opportunity for the study of garden flowers.

Elective Courses.

50. I.	51. II.	52. III.	Greenhouse Management,	Juniors.
53. I.	54. II.		Greenhouse Construction,	Juniors.
75. I.	76. II.	79. III.	Commercial Floriculture,	Seniors.
77. II.			Conservatory Plants,	Seniors.
78. III.			Garden Flowers and Bedding Plants,	Juniors, Seniors.
80. III.			Seminar,	Seniors.

Forestry.

Professor GROSE.

The forestry major is designed to give a grounding in the branches of natural science upon which forest development is based. It continues, further, to give a knowledge of such practical forestry details as the distinguishing characteristics of the various species of trees and commercial lumber, the principles of silviculture, forest management, forest utilization, and forest nursery practice.

The department has an unusually complete equipment of the various instruments used in forest mensuration, forest mapping and engineering, timber estimating, log scaling, board measuring, etc.; and a large assortment of boards illustrative of the various commercial woods found in the lumber markets. The State Forest Nursery, comprising 6 acres of land and containing, approximately, 5,000,000 trees, transplants and seedlings, is on the college farm. Forests containing every variety of tree common to New England are within walking distance of the college. The college campus affords an arboretum containing a large number of trees not native to New England. The Mount Toby Demonstration Forest has an area of approximately 750 acres, and contains the various types of forest growth found throughout the State. It serves as a field laboratory in which students have the privilege of working out problems in silviculture, forest mensuration and management. Improvement cuttings, cuttings for utilization, and forest plantings are conducted by the department.

Elective Courses.

50. I.	Dendrology,	Juniors.
51. II.	Wood Technology,	Juniors.
52. III.	Principles of Forestry,	Juniors.
53. III.	Silviculture,	Juniors.
54. IV.	Arboriculture,	Juniors.
75. I.	Forest Mensuration,	Seniors.
78. III.	Seminar,	Seniors.

Horticultural Manufactures.

Professor CHENOWETH, MR. ROBERTSON.

The courses aim to give a practical knowledge of the problems connected with food preservation. Emphasis is placed upon the conservation of the cheaper grades of fruits and vegetables, to the end that the whole crop may be marketed at a profit and that wholesome food products may result from what would otherwise be lost. The social and economic values of this work are constantly emphasized.

The department occupies three laboratory rooms in Flint Laboratory, two in Fisher Laboratory, with offices in Wilder Hall and French Hall. The general equipment of the department, both for the use of students and for manufacturing purposes, may be grouped under the following heads: —

1. *Canning.* — A modern canning outfit, including both steam-pressure cookers and hot-water baths, hand and power can sealers, peeling and slicing machines, a string-bean cutter, heat-penetration thermometers, electric incubator and a large assortment of all types of home canning equipment.

2. *Evaporation.* — Two small orchard evaporators, a tunnel drier, peeling machines, slicers and a general assortment of driers adapted to home evaporation.

3. *Fruit Juices, Butters, etc.* — A hand cider mill, a motor-driven hydraulic press, a steam-jacketed kettle, an apple-butter cooker, and cider and vinegar testing apparatus.

Elective Courses.

75. I. 76. II. 77. III. Horticultural Manufactures, . . . Seniors, Graduates.

Horticulture.

Professor WAUGH, Assistant Professor THOMPSON, Assistant Professor ROGERS.

The general subject of horticulture divides naturally into subjects of pomology, floriculture, forestry, landscape gardening and vegetable gardening. A number of courses relate to more than one of these subjects, and are therefore grouped here under the general designation of horticulture.

Required Course.

1. I. Horticulture, elementary, . . . Freshmen.

Elective Courses (General).

27. III. Nursery Practice, . . . Sophomores.
50. I. 51. III. Plant Material, . . . Juniors.

Landscape Gardening.

Professor WAUGH, Assistant Professor HARRISON.

The purposes of the courses are: (1) to train men for the profession in all its branches. As a rule graduates should first enter the employ of established landscape architects, nurserymen or park superintendents, and after an apprenticeship of several years those who have the requisite technical and business ability may set up for themselves. (2) To train men for public-service work in national, State and municipal parks and forests. (3) To train men for country planning, this function being exercised through various public institutions and organizations. (4) To train teachers and extension workers in lines of landscape gardening and civic improvement. (5) To give a broad and liberal general education stressing the fundamental principles of art.

The department has large, well-lighted drafting rooms, with necessary equipment, such as planimeters, eidograph, pantograph, blue-printing outfit,

etc.; and a complete outfit of surveying instruments, including transits, levels, plane tables, prismatic compasses, hand levels, etc. The college campus presents an unusually good collection of the plant materials used in landscape gardening.

Elective Courses.

50. I.	Mapping and Topography,	Juniors.
51. II.	Elements of Landscape Gardening,	Juniors.
52. III.	General Design,	Juniors.
75. I.	Theory of Landscape Art,	Seniors, Graduates.
76. II.	Civic Art,	Seniors.
77. III.	Country Planning,	Seniors.
78. III.	Architecture,	Juniors, Seniors.
79. III.	Construction and Maintenance,	Juniors, Seniors.
80. I.	Theory of Design,	Juniors.
81. II.	Estate Design,	Seniors.
82. III.	Park Design,	Seniors.

Pomology.

Professor SEARS, Assistant Professor DRAIN, Assistant Professor FRENCH, Assistant Professor GOULD.

The object of the courses is to give a training which shall be thoroughly practical and yet scientific. This will fit the men to enter the field of practical fruit-growing, or it will furnish an excellent foundation for further study.

The department has 50 acres in fruit plantations. The apple orchards comprise about 35 acres, and there are blocks of pears, peaches, plums and cherries. In small fruits there are plantings of strawberries, raspberries, blackberries, currants and gooseberries. There are three vineyards, with a total area of 5 acres, in which the leading varieties and the principal types of pruning and training are represented. In these plantations are 50-varieties of grapes, representing three native American species and many hybrids; 20 varieties of peaches; 20 varieties of pears; 25 of plums, including five species and many hybrids; and 100 varieties of apples.

The department has an excellent equipment of spraying and dusting machinery, including various styles and sizes of power sprayers, and many types of barrel pumps and smaller sprayers. There is also an excellent assortment of orchard tools, including plows, harrows, fertilizer sowers, etc.

Fisher Laboratory is one of the best planned and equipped packing and storage plants in the United States. It includes six refrigerated rooms; four storage rooms not refrigerated; one large laboratory room and one classroom, besides ample storage room for fruit packages and equipment. The equipment for the building itself includes four types of apple sizers; packing tables and box and barrel presses of various types, besides all kinds of packages and the smaller equipment necessary for thoroughly modern work in grading and

packing fruit. The department is equipped with lockers and with pruning and other tools for the use of students in laboratory work, which is made a leading feature in all the courses in pomology.

Elective Courses.

50. I.	51. II.	52. III.	Practical Pomology,	Juniors.
53. IV.			Small Fruits,	Juniors.
75. I.	76. II.		Systematic Pomology,	Seniors.
77. I.			Commercial Pomology,	Seniors.
78. III.			Spraying,	Seniors.
79. III.			General Pomology,	Seniors.
80. I.	81. II.	82. III.	Seminar,	Seniors.

Vegetable Gardening.

Professor TOMPSON, Professor DACY, Mr. HARRIS.

The courses cover the principles and practices of the commercial production of vegetables in the open, and the forcing of vegetables in cold frames, hotbeds and greenhouses. They are designed for students who wish to engage in the business for themselves or for others, or who wish to become teachers or investigators in the more technical phases of the subject.

The department has 12 acres of land, greenhouses, hotbeds and cold frames, with modern equipment devoted to the production of a wide variety of crops. These afford excellent subject-matter for study, and opportunity for close contact with the actual problems of the business.

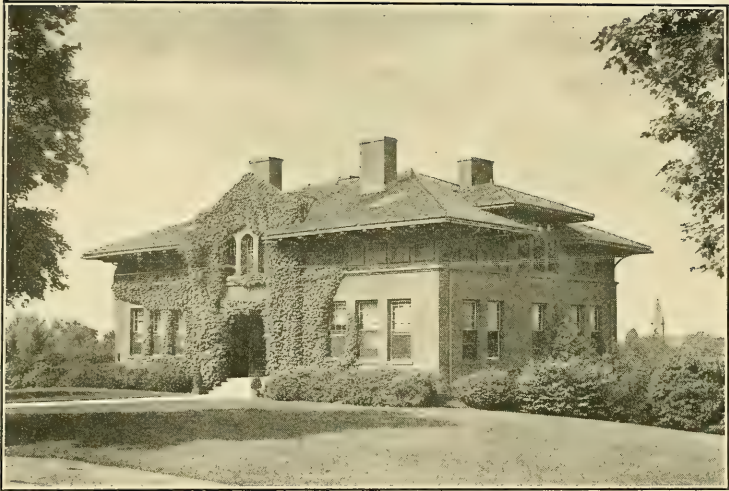
Elective Courses.

50. III.			General Vegetable Gardening,	Juniors.
51. I.	52. II.	53. III.	Practical Vegetable Gardening,	Juniors.
75. I.			Systematic Vegetable Gardening,	Seniors.
76. II.			Greenhouse Construction and Vegetable Forcing,	Seniors.
77. III.			Commercial Vegetable Growing,	Seniors.
78. I.	79. II.	80. III.	Seminar,	Seniors.

Drawing.

Elective Courses.

25. I.			Free-hand Drawing,	Sophomores.
26. II.	27. III.		Mechanical Drawing,	Sophomores.



Wilder Hall—Pomology Building

DIVISION OF SCIENCE.

Professor FERNALD.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Botany.

Professor OSMUN, Professor ANDERSON, Assistant Professor CLARK, Assistant Professor McLAUGHLIN, Assistant Professor TORREY.

A knowledge of the principles of plant life is fundamental in agricultural education. The required courses in botany are planned with this and the general educational value of the subject in view. Elective courses are of two types: (1) those which have for their chief aim the direct support of technical courses in agriculture and horticulture, and (2) those providing broader, more intensive training in the science. Courses in the second group may lead, when followed by postgraduate study, to specialization in the field. They also furnish excellent training for those specializing in other sciences and in scientific agriculture. In all undergraduate courses the relation of the science of botany to agriculture is emphasized.

The department occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. The building has two lecture rooms with seating capacity of 154 and 72, respectively; one seminar and herbarium room; large laboratories for general and special work; and smaller rooms

for advanced students. A glass-enclosed laboratory for plant physiology adjoins the main building and provides unusual facilities for the study of phenomena of plant life. In addition, a greenhouse 28 by 70 feet is connected with the building. This is for experimental work in plant pathology and physiology, and for growing plants needed for instruction. The experiment station laboratories devoted to botanical research are in this building.

The laboratories and lecture rooms are of modern construction, finely lighted, and equipped with compound and dissecting microscopes, microtomes, paraffin and drying ovens, physiological and other apparatus, and a large collection of charts. The herbarium contains about 20,000 sheets of seed plants and ferns, 1,200 sheets of liverworts and mosses, and 25,000 specimens of fungi. Facilities and equipment for the study of plant physiology and pathology are excelled in few other institutions.

Required Courses.

3. III.	Introductory Botany, elementary,	Freshmen.
25. I.	Introductory Botany,	Sophomores.

Elective Courses.

26. II.	Morphology and Taxonomy of the	
	Lower Plants (Cryptogamia),	Sophomores.
27. III.	The Vascular Plants,	Sophomores.
50. I. 51. II.	Diseases of Crops,	Juniors.
52. I. 53. II. 54. III.	Systematic Mycology,	Juniors.
55. I. 56. II.	Plant Histology,	Juniors.
58. I. 59. II.	Systematic Botany of the Higher	
	Plants,	Juniors.
75. I. 76. II. 77. III.	Plant Pathology,	Seniors.
78. I. 79. II. 80. III.	Plant Physiology,	Seniors.
82. II. 83. III.	Cytology and Embryology,	Seniors.
86. I. 87. II. 88. III.	Seminar,	Seniors, Graduates.

General and Agricultural Chemistry.

Professor LINDSEY, Professor WELLINGTON, Professor CHAMBERLAIN, Professor PETERS,
Professor ———, Assistant Professor SEREX.

In teaching the courses in chemistry, emphasis is laid on both their educational and their vocational value. The courses in the freshman year deal with fundamental principles, and give the student such an understanding of the subject as will enable him to apply it in farm practice. The more advanced courses, including quantitative analysis and organic, physiological and physical chemistry, are for those who intend to become teachers and workers in the allied sciences, or who desire to follow agricultural chemistry as a vocation. Advanced training is given by means of postgraduate courses (see Graduate School).

Those completing the undergraduate courses are fitted for positions in the agricultural industries, — fertilizer, feed and insecticide manufacture, — as well as in other lines of industry, and in the State experiment stations and in commercial laboratories. Postgraduate students are prepared for positions as teachers in high schools and colleges, and for more advanced positions in industry and in the experiment stations.

An entire building is devoted to the needs of the department. The basement is used for the storage of apparatus and chemicals. The first floor contains laboratories for organic, physiological and physical chemistry, and qualitative analysis. The second floor is occupied by the general lecture room, the reading room, offices for the several members of the staff, and laboratories for analytical chemistry. The third floor has desk room and hoods sufficient to accommodate 90 students at one time in general chemistry. On this floor is also a lecture room seating 56 students.

The entire laboratory is well equipped with the necessary apparatus and chemicals for all students who desire to perfect themselves as expert chemists, or who wish to study chemistry as a supplement to some other kind of practical or scientific work. The equipment includes a valuable and growing collection of specimens and samples of minerals, soils, raw and manufactured fertilizers, foods, milk products, fibers, various other vegetable and animal products, and artificial preparations of mineral and organic compounds; and also a series of preparations for illustrating the various stages of different manufactures from raw material to finished product.

Required Courses.

1. I.	2. II.	General Chemistry, elementary,	.	.	.	Freshmen.
3. III.		Inorganic Agricultural Chemistry,	.	.	.	Freshmen.
4. I.		Advanced General Chemistry,	.	.	.	Freshmen.
5. II.		Inorganic Agricultural Chemistry,	.	.	.	Freshmen.
6. III.		Organic Agricultural Chemistry,	.	.	.	Freshmen.

Elective Courses.

25. I.		Qualitative Analysis (basic),	.	.	.	Sophomores.
26. II.		Qualitative Analysis (acidic),	.	.	.	Sophomores.
27. III.		Quantitative Analysis,	.	.	.	Sophomores.
51. I.	52. II.	Organic Chemistry,	.	.	.	Juniors.
62. III.		Advanced Quantitative Analysis,	.	.	.	Juniors.
65. III.		Physical Chemistry,	.	.	.	Juniors.
76. I.		Milk and Butter Analysis,	.	.	.	Seniors.
77. II.		Cattle Feed, Water and Miscellaneous Analysis,	.	.	.	Seniors.
80. I.		Physiological Chemistry,	.	.	.	Seniors.
86. II.		Review of General Chemistry,	.	.	.	Seniors.
87. III.		History of Chemistry,	.	.	.	Seniors.
91. III.		Special Work in Agricultural Chemical Analysis,	.	.	.	Seniors.
92. II.	93. III.	Special Work in Physiological and Organic Agricultural Chemistry,	.	.	.	Seniors.
94. II.	95. III.	Special Work in Physical Chemistry,	.	.	.	Seniors.

Entomology.

Professor FERNALD, Professor CRAMPTON, Assistant Professor REGAN, Assistant Professor PHILLIPS.

The introductory Courses 26 and 27, taken together, present a comprehensive view of the relation of insects to man, particularly as crop pests. The most important pests are carefully studied, together with the methods for their control. Courses 50 and 51 are arranged for special study of the pests of any one line of agricultural or horticultural occupation, selected by the student according to his plan of future work, with the intent of making him thoroughly familiar with the pests he will meet in his selected work after graduation, and the means of controlling them. The remaining courses are for the training of men as State or experiment station entomologists; for those going into the care of trees, etc., on estates, or for cities and towns; and as entomological experts, for which the demand has been very large.

Fernald Hall provides excellent lecture rooms and laboratories for this department. The laboratories are provided with individual desks, equipped with microscopes and all needed apparatus of all kinds. Dissecting microscopes, binoculars, microtomes, photographic apparatus, glassware and reagents are available for use, and electric light and gas are connected with each desk. Two laboratories, one for juniors and seniors, the other for graduate students, are thus equipped. A department library containing all the more important works on insects, supplemented by others on the subject in the main library, and by the private libraries of the professors, make available more than 25,000 books and pamphlets on this subject. In addition, all the current magazines are received and their files are accessible to every one. A card catalogue giving references to the published articles on different insects contains about 65,000 cards, and is probably the largest index of its kind in the world. Spray pumps, nozzles and spraying appliances of all kinds are in use in various parts of the courses, and a large collection of insecticides is accessible for study. Photographic rooms are specially prepared for the photography of insects, and the greenhouses, gardens, orchards and the grounds of the college provide wide opportunities for the study, under natural conditions, of insect pests.

Elective Courses.

26. II.	27. III.	General and Economic Entomology,	Sophomores.
50. I.	51. II.	Pests of Special Crops,	Juniors.
52. II.		Insecticides and their Application,	Juniors.
53. I.		Insect Morphology,	Juniors.
54. I.		Insect Classification,	Juniors.
56. II.		Pests of Special Crops,	Juniors.
55. III.		Economic Entomology,	Juniors.
75. III.		Forest and Shade-tree Insects,	Juniors.
76. I.	77. II.	Advanced Entomology,	Seniors.
90. II.	78. III.	Evolution,	Juniors.

Beekeeping.

Elective Courses.

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|-----|------|------------------------------------|----------|
| 65. | III. | Introductory Beekeeping, | Juniors. |
| 85. | I. | Advanced Beekeeping, | Seniors. |

Mathematics and Civil Engineering.

Professor OSTRANDER, Professor MACHMER, Assistant Professor MOORE, Mr. PORTER.

The work of the freshman year is required. It is intended to furnish the necessary drill and groundwork needed for many of the scientific and practical courses of other departments. Thoroughness and accuracy are insisted upon. The advanced work in mathematics is taught from a practical standpoint, and many of its applications to other subjects are given. The courses in surveying and civil engineering are given to furnish the groundwork for a professional career. Special emphasis is given to the subjects bearing on highway construction and maintenance.

For drawing, a room on the north side is used for the draughting. It has draughting tables, T squares, scales, etc., for twenty students. Vernier protractors, parallel rules and steel T squares are available for precise work. A small room is devoted to blue printing.

In surveying, the department has a considerable number of chains and tapes, two railroad compasses, a builder's level, two dumpy levels, two Y levels and two old levels used for teaching the adjustments. Six transits are available for student use. Two are provided with solar attachments. An omnimeter with vernier reading to ten seconds is available for geodetic work. A hand level, mining aneroid barometer, and prismatic compass are provided for reconnaissance work. A set of Gilmore's needles and a Fairbanks' machine are used for cement testing.

Required Courses.

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|----|------|----|-----|--|-----------|
| 1. | I. | 2. | II. | Higher Algebra, | Freshmen. |
| 3. | III. | | | Solid Geometry, | Freshmen. |
| 5. | II. | | | Plane Trigonometry, | Freshmen. |
| 6. | III. | | | Mensuration and Computation, | Freshmen. |

Elective Courses.

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|-----|------|-----|------|--|-------------|
| 26. | II. | 27. | III. | Plane Surveying, | Sophomores. |
| 50. | I. | | | Analytic Geometry, | Juniors. |
| 51. | II. | | | Differential and Integral Calculus, | Juniors. |
| 52. | III. | | | Integral Calculus, | Juniors. |
| 53. | II. | | | Elementary Structures, | Juniors. |
| 75. | I. | | | Hydraulics and Sanitary Engineering, | Seniors. |
| 76. | I. | | | Materials of Construction, Foundations and Masonry Construction, | Seniors. |
| 77. | II. | 78. | III. | Roads and Railroads, | Seniors. |
| 79. | I. | | | Applied Mechanics, | Seniors. |

Microbiology.

Professor MARSHALL, Assistant Professor ITANO, Mr. AVERY, Miss GARVEY.

Three objectives are sought in the arrangement of the courses following: (1) Introductory courses (50 and 51) needed in the general training of every college student. (2) An introductory course followed by a specific course (as 80, 81, 82, 83), necessary to every student engaged in the Division of Agriculture, with which the specific course deals. (3) Introductory courses (50 and 51) followed by Courses 52, 75, 76 and 81, preparatory for students who are aiming to specialize in agricultural microbiology. (Courses 75, 76 and 81 are adapted to those having Courses 50 and 51 only, and are also adapted to those majoring in microbiology.)

The microbiological work is carried on in a building especially designed for it. There are 4 class laboratory rooms, 8 private laboratory rooms, 1 lecture room, 5 incubator rooms, 3 sterilizing rooms, 3 hood rooms, 3 washing rooms, 3 inoculating rooms, 3 weighing rooms, an animal room, a photographic and a dark room, a sub-basement refrigerator room, a library and 4 office rooms.

The class laboratory rooms are so arranged that individual desks are available for student use. Hot and cold water and gas connections are convenient for each desk; high-pressure steam and electric connections are also available. The building is well lighted and of sanitary construction; all the walls are of brick, and the building is fireproof.

The library is equipped with such books and current periodicals as are useful in the conduct of bacteriological work and investigations. Twenty-four scientific magazines are available regularly.

There are incubators, both electric and gas, hot-air sterilizers, ordinary steam sterilizers, autoclaves, an inspissator, blood-testing apparatus, vacuum apparatus, air-pressure apparatus, shaker, grinder, centrifugal machines, a water still of 5 gallons per hour capacity, Hoskins' combustion furnace, a balopticon, complete microphotographic equipment, microscopes, microtome, and such other apparatus, glassware and chemicals as are needed for extensive and intensive work.

Elective Courses.

50. I, II and III.	Introductory and General Microbiology,	Juniors.
51. II and III.	Morphological, Cultural and Physiological Microbiology,	Juniors.
52. III.	Advanced Morphological, Cultural and Physi- ological Microbiology,	Juniors.
75. II. 76. III.	Agricultural Microbiology,	Seniors.
80. II.	Soil Microbiology,	Seniors.
81. I.	Hygienic Microbiology,	Seniors.
82. I.	Dairy Microbiology,	Seniors.
83. I.	Food Microbiology,	Seniors.

Special courses for women:

1. I.	3. III.	Elementary Microbiology,	. . . . .	Freshmen.
25. I.		Personal Hygiene,	. . . . .	Sophomores.
27. III.		Sanitary Science,	. . . . .	Sophomores.

Physics.

Professor HASBROUCK, Professor HARRINGTON, Mr. ALDERMAN.

The fundamental and basic importance of the laws and phenomena of physics makes necessary no explanation of the introduction of this subject into the curriculum of an agricultural college. The logical development of the subject emphasizes the importance of physics as a science in itself. Special emphasis is laid, however, on the correlation of the principles studied with the sciences of agriculture, botany, chemistry and zoölogy, thus furnishing an extra tool by use of which the student's work in all the subjects may be more effective.

In Courses 25, 26 and 27 the subject-matter is presented with the idea of its special application primarily in the work in agriculture and general science. The full year's work is advised for all students continuing work specifically in the Division of Science. Courses 25 and 26 are required of all students. The subject-matter is especially selected and arranged for its practical application rather than its theoretical development. Courses 50, 51 and 52 are advised for students in chemistry, general biology, microbiology and general science. The subject-matter is selected, and the courses developed, with the idea of making the student proficient in laboratory manipulation. Sufficient theory is given in connection with the work to enable the student to apply the knowledge and practice thus gained in the departments indicated above.

The department has at its command a building on the east campus, containing a general lecture room and laboratory for sophomore work, a laboratory for junior work, and in the basement one small laboratory for quantitative work in light measurement. There is also in the basement a fairly well-equipped shop for the repair and construction of apparatus used in the department work. The usual apparatus for the demonstration in the lecture room is in the possession of the department. The laboratory equipment is such as to enable the department to offer qualitative work in mechanics, heat, electricity and light.

Required Courses.

25. I.	General Physics,	. . . . .	Sophomores.
26. II.	Electricity and Magnetism,	. . . . .	Sophomores.

Elective Courses.

27. III.			Heat and Light,	.	.	.	Sophomores.
50. I.	51. II.	52. III.	Electricity, Heat and Light,	.	.	.	Juniors.
75. I.	76. II.	77. III.	Light,	.	.	.	Seniors, Graduates.

Veterinary Science.

Professor PAIGE, Professor GAGE.

The courses in veterinary science have been arranged to meet the needs (1) of students who propose following practical agriculture; (2) of prospective students of human and veterinary medicine; and (3) of teachers and laboratory workers in the biological sciences.

The department occupies a modern laboratory and hospital stable, built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There is a lecture hall, a museum, a demonstration room, a photographing room and a workshop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in every department of veterinary science, including pathology, serology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

Elective Courses.

50. I.	Veterinary Hygiene and Stable Sanitation, .	Juniors.
51. I.	Comparative (Veterinary) Anatomy, .	Seniors.
75. II.	General Veterinary Pathology, Materia Medica and Therapeutics, .	Juniors.
76. II.	Theory and Practice of Veterinary Medicine; General, Special, and Operative Surgery, .	Seniors.
78. I.	Essentials of General Pathology, .	Seniors.
79. II. 80. III.	Essentials of General Animal Pathology, .	Seniors.
85. I. 86. II. 87. III.	Avian Pathology, .	Seniors.

Zoölogy and Geology.

Professor GORDON, Dr. ABBOTT.

The facts and principles of the sciences of zoölogy and geology have important applications in industry and the arts, and with those of their sister sciences form a body of knowledge of value and interest with which the educated man finds it necessary to gain a close familiarity. The elective courses in this depart-

ment stand as offerings to students who wish to supplement their work in other departments, or who, for any reason, wish to enlarge their knowledge in either zoölogy or geology. Students are encouraged to consult the department about any courses which may be available to them, and which might prove necessary or helpful for any line of work they may wish to follow.

The building occupied jointly by the department of entomology and the department of zoölogy and geology has for the work in zoölogy and geology laboratories equipped with gas, compound microscopes and the accessories needed for study, research and demonstration in these subjects. There are two lecture rooms used jointly by the two departments. The Zoölogical Museum has a representative collection of several thousand specimens of animals, and is drawn upon for material illustrating the various courses.

ZOÖLOGY.

Required Course.

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|--------|--|-------------|
| 25. I. | General Principles and Teaching
of Zoölogy, | Sophomores. |
|--------|--|-------------|

Elective Courses.

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|----------|---|-------------|----------------------------------|---------------------|
| 27. III. | Elements of Mammalian Anat-
omy, | Sophomores. | | |
| 50. I. | 51. II. | 52. III. | Synoptic Invertebrate Zoölogy, . | Juniors. |
| 53. I. | Elements of Microscopic Tech-
nique, | | | Juniors. |
| 54. II. | Histology, | | | Juniors. |
| 75. I. | 76. II. | 77. III. | Special Zoölogy, | Juniors. |
| 79. III. | Ornithology, | | | Seniors, Graduates. |

GEOLOGY.

Required Course.

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|--------|---|-----------|
| 2. II. | Agricultural Geology, elementary, | Freshmen. |
|--------|---|-----------|

Elective Course.

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|----------|----------------------------|-------------|
| 27. III. | General Geology, | Sophomores. |
|----------|----------------------------|-------------|



Fernald Hall—Entomological Building

DIVISION OF THE HUMANITIES.

Professor —.

Economics and Sociology.

Professor —.

Courses in 1921-22, given by Assistant Professor Parker, Acting Head of the Department, assisted by Professor Crook of Amherst College, and Professor Sims.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

The courses in economics and sociology are planned with the purpose of giving the student that knowledge and understanding of the important factors and problems in this field of study and life which every active citizen and educated man ought to have.

Elective Courses.

26. II.	Civilizations, Ancient and Modern,	Sophomores.
50. II.	Business and Industry,	Juniors, Seniors.
51. I.	Introduction to Economic Principles and Problems,	Juniors.
75. I.	Social Institutions and Social Reforms,	Seniors.
77. III.	Public Finance, Taxation, Money, and Banking,	Seniors.

History and Government.

Elective Courses.

50. III.	Government,	Juniors.
54. I.	Modern European History,	Juniors.
79. II.	European History since 1870,	Seniors.

Languages and Literature.

Professor LEWIS, Professor PATTERSON, Professor MACKIMMIE, Professor ASHLEY, Assistant Professor PRINCE, Assistant Professor JULIAN, Assistant Professor RAND, Miss GOESSMANN, Mr. THISSELL, Mr. BÖGHOLT.

ENGLISH.

Required Courses.

1. I.	2. II.	3. III.	English Composition,	Freshmen.
25. I.	26. II.	27. III.	English Literature,	Sophomores.

Elective Courses.

50. I.	English Poetry of the Romantic Period,	Juniors.
51. II.	English Poetry in the Nineteenth Century,	Juniors.
57. III.	English Poetry in the Nineteenth Century,	Juniors.
52. III.	English Writers from Milton to Pope,	Juniors.
53. I.	English Prose of the Romantic Period,	Juniors.
54. II.	English Prose in the Nineteenth Century,	Juniors.
58. III.	English Prose in the Nineteenth Century,	Juniors.
55. II. 56. III.	American Literature,	Juniors.
60. I. 61. II.	The Literature of Rural Life,	Juniors.
75. III.	Prose Fiction,	Seniors.
79. II. 80. III.	The Drama,	Seniors.

APPLIED ENGLISH—RURAL JOURNALISM.

The courses in rural journalism have two chief aims: first, to turn the student's attention toward matters of contemporary concern; second, to provide training for students who may wish to enter journalism (especially agricultural or industrial journalism or non-urban newspaper work), or who are preparing for the numerous other vocations in which acquaintance with newspaper practices and requirements is of value. All of the courses afford constant practice in writing. So far as conditions permit, instruction is largely individual.

Elective Courses.

50. I.	51. II.	52. III.	Advanced Compositions,	Juniors.
53. I.	54. II.	55. III.	News-gathering and News-writing,	Juniors.
77. I.	78. II.	79. III.	Editorial Materials and Methods,	Seniors.
80. I.	81. II.	82. III.	Advanced Journalistic Practice,	Seniors.

PUBLIC SPEAKING.

Required Course.

- | | | |
|--------------------------|------------------------------|-----------|
| 1. I, II and III. | Public Speaking, elementary, | Freshmen. |
|--------------------------|------------------------------|-----------|

Elective Courses.

- | | | |
|----------------|---------------------|----------|
| 50. I. | Argumentation, | Juniors. |
| 51. II. | Occasional Oratory, | Juniors. |

French and Spanish.

Professor MACKIMMIE, Mr. THISSELL.

The aim of the courses in French and Spanish is to give the student a practical knowledge of these languages for the purpose of wider reading and research, to introduce him to some of their treasures in art and science, and through the literature to acquaint him with the people. In the elementary courses as much time as possible is given to oral work, to develop a speaking, as well as a reading, knowledge of the tongue.

FRENCH.

Required Courses.

- | | | | | |
|--------------|---------------|----------------|----------------------|-----------|
| 1. I. | 2. II. | 3. III. | Elementary French, | Freshmen. |
| 4. I. | 5. II. | 6. III. | Intermediate French, | Freshmen. |

Elective Courses.

- | | | | | |
|---------------|----------------|-----------------|----------------------|-------------|
| 25. I. | 26. II. | 27. III. | Intermediate French, | Sophomores. |
| 28. I. | 29. II. | 30. III. | Advanced French, | Sophomores. |
| 50. I. | 51. II. | 52. III. | Scientific French, | Juniors. |
| 75. I. | 76. II. | 77. III. | French Literature, | Seniors. |

SPANISH.

Elective Courses.

- | | | | | |
|---------------|----------------|-----------------|-------------------------|----------|
| 50. I. | 51. II. | 52. III. | Elementary Spanish, | Juniors. |
| 75. I. | 76. II. | 77. III. | Modern Spanish Authors, | Seniors. |

German and Music.

Professor ASHLEY, Assistant Professor JULIAN.

GERMAN.

The courses in German are intended to give the student a reading knowledge of the language and to introduce to him some of the masterpieces of German literature. To the student interested in pursuing advanced reading in scientific German, opportunity is given to do corollary reading in his major subject, in collaboration with the head of that department.

Required Courses.

1. I.	2. II.	3. III.	Elementary German,	.	.	.	Freshmen.
4. I.	5. II.	6. III.	Intermediate German,	.	.	.	Freshmen.

Elective Courses.

25. I.	26. II.	27. III.	Intermediate German,	.	.	.	Sophomores.
28. I.	29. II.	30. III.	Advanced German,	.	.	.	Sophomores.
50. I.	51. II.	52. III.	Scientific German,	.	.	.	Juniors.
75. I.	76. II.	77. III.	German Literature,	.	.	.	Seniors.
78. I.	79. II.	80. III.	Conversation and Composition,	.	.	.	Seniors.

MUSIC.

Elective Course.

50. I.	51. II.	52. III.	History and Interpretation of Music,	.	Juniors.
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Stockbridge Hall — Agricultural Building

DIVISION OF RURAL SOCIAL SCIENCE.

President BUTTERFIELD.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Agricultural Economics.

Professor CANCE, Assistant Professor SAWTELLE, Mr. MAGINNIS, Professor HART.

Instruction in agricultural economics is designed to show that the agricultural industry justifies its existence chiefly as a supplier of food and raw textile materials for human consumption; that agricultural success is measured by production of values rather than by production of volume of agricultural products; that the goal of the farmer is the largest net profit over a long-time period; that agricultural production includes all processes from purchase of seed and fertilizer and preparation of seedbed until the product reaches the consumer, including collection, transportation, storage, financing, packing, handling and selling; that a knowledge of the business of agriculture and agricultural commerce is to-day more necessary than a knowledge of agricultural technique.

The work of this department is conducted by means of lectures, readings and research in both library and field. A catalogue, now containing some 12,000 cards, covering the various phases of agricultural economics, is maintained. The department is also supplied with a large collection of maps, charts and statistical reports on the prices and supply of agricultural products. A goodly number of regular reports of the Bureau of Markets and other divisions of the United States Department of Agriculture are available for the use of students. Two series of bound volumes of bulletins are kept in the department offices, with duplicate series in the college library; one series already contains 12 volumes on "Co-operation in Agriculture," and the other, 15 volumes on "Marketing of Farm Products."

Required Course.

- | | | |
|----------------|---|-------------|
| 26. II. | Agricultural Industry and
Resources, | Sophomores. |
|----------------|---|-------------|

Elective Courses.

- | | | |
|-----------------|--|----------|
| 50. I. | Elements of Agricultural
Economics, | Juniors. |
| 51. III. | Historical and Compara-
tive Agriculture, | Juniors. |
| 52. II. | Co-operation in Agricul-
ture, | Juniors. |
| 53. III. | The Agricultural Market, | Juniors. |

75. II.	Rural and Business Law,	Seniors.
76. II.	Transportation of Agricultural Products, . . .	Seniors, Graduates.
77. I.	Problems in Agricultural Economics, . . .	Seniors, Graduates.
78. III.	Agricultural Credit Facilities, . . .	Seniors, Juniors.
79. I.	Agricultural Statistics, . . .	Seniors, Juniors, Graduates.
80. I. 81. II. 82. III.	Seminar, . . .	Seniors, Graduates.
85. II. 86. III.	Agricultural Prices, . . .	Seniors, Graduates.

Agricultural Education.

Professor HART, Professor WELLES, Mr. HEALD,¹ Miss HAMLIN.

The primary aim of the department is training students for service in some form of educational work. This service may be in one or more of several fields. Teaching is the most common, and includes vocational agriculture. Students contemplating preparation for State approval should confer as early as possible with the head of the department, to the end that they may secure a proper distribution of subjects and properly utilize vacations in acquiring the necessary farm practice. This department also serves as the avenue for recommending graduates to the State Department of Education for teaching positions, including such positions as require the State teachers' certificate.

The equipment includes a combination classroom and laboratory furnished with such articles as seem advisable for the effective work of a high school department of agriculture. This room represents to teachers in training the usable things for their work in a school department. The office of the department is equipped with books and pamphlets on agricultural education properly catalogued.

CO-OPERATION BETWEEN THE STATE DEPARTMENT AND THE COLLEGE.

Under an agreement with the Division of Vocational Education of the State Department of Education, the department of agricultural education is the co-operating agency at the college for the training of teachers of agriculture and other related subjects.

Required Course.

25. II.	Agricultural Opportunities for Women,	Sophomores.
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Elective Courses.

50. I.	Educational Psychology, . . .	Juniors.
51. I, II and III.	Principles and Methods of Teaching,	Juniors.

¹ Representing the State Department of Education in the administration of vocational education acts.

52. III.	History and Philosophy of Education,	Juniors.
75. II.	Organization and Supervision of Secondary Education, . . .	Seniors.
76. I, II and III.	Special Methods in Teaching Vocational Agriculture, . . .	Seniors.
77. II. 78. III.	County Agent Work,	Seniors.
80. I, II, III and IV.	Supervised Teaching,	Seniors, Graduates.
90. III.	Genetic Psychology,	Seniors.
91. I.	Rural Education,	Graduates.

Rural Sociology.

Professor PHELAN, President BUTTERFIELD, Professor SIMS, Mr. NOVITSKI.

The courses in rural sociology are designed for two purposes: first, to give students an appreciation of the general problems of country life; second, to afford a definite training for students who wish to take up some specific form of social service. In the last ten years rural sociology has been introduced as a subject into more than 50 per cent of the agricultural schools and colleges. There is a good demand for teachers, and an increasing opportunity in other directions in this subject. The courses afford the student an opportunity to pursue graduate as well as undergraduate work. The library of the college is unusually well equipped with rural sociological material.

Required Course.

27. III.	Elements of Rural Sociology, . . .	Sophomores.
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Elective Courses.

50. I.	Social Condition of Rural People, . . .	Juniors.
51. II.	Rural Government,	Juniors.
52. III.	Rural Organization,	Juniors.
76. I.	Field Work in Rural Sociology, . . .	Seniors.
77. II.	Rural Social Surveys,	Seniors.
79. I. 80. II. 81. III.	Seminar,	Seniors.

Rural Home Life.

Miss SKINNER, Miss GRIZZLE.

The Department of Rural Home Life offers elective courses for students majoring in other departments of the college. Fundamentally this training is such as will help young women to be better prepared to adjust themselves readily to their environment in the home and in the community, and to help them realize their responsibility as good homemakers and as good citizens.

The food laboratory, located in the entomology building, is fitted with individual desks (cabinet form) to hold utensils and materials for each student.

Each table is equipped with gas stoves. A storage cabinet is provided with bins for supplies and cupboard space for large utensils and illustrative material. This room is well lighted and pleasant. The clothing laboratory is located in the Adams House. The equipment consists of sewing machines, cabinets, work tables, cutting tables, electric irons, dress forms and a collection of materials illustrating the production of textiles for clothing and household use.

Required Course.

2. II.	Introduction to Home Economics,	Freshmen.
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Elective Courses.

25. I.	26. II.	27. III.	Textiles and Clothing,	Sophomores.
50. I.	51. II.	52. III.	Foods and Cookery,	Juniors.
75. I.	76. II.		Household Management,	Seniors.
78. III.			Home Nursing,	Seniors.

GENERAL DEPARTMENTS.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Military Science and Tactics.

Major FREDERICK E. SHNYDER, Cavalry, U. S. A.; Major HERMAN KOBBE, Cavalry, U. S. A.; Captain JAMES V. V. SHUFELT, Cavalry, U. S. A.; Captain THOMAS BRADY, JR., Cavalry, U. S. A.; Technical Sergeant JOHN J. LEE, U. S. A., Retired; Staff Sergeant JAMES A. WARREN, Cavalry; and a detachment of enlisted men of the United States Army.

Under act of Congress (July 2, 1862) military instruction under a regular army officer was required in this college of all able-bodied male students. Under act of Congress June 3, 1916, as amended by act of Congress September 8, 1916, there was established at this college in April, 1917, an infantry unit of the Reserve Officers' Training Corps. Following the World War and an act of Congress (July 9, 1918) the Reserve Officers' Training Corps is in operation under the regulation of the War Department, administered by the president of the college and the professor of military science and tactics.

Beginning with the fall term, 1920-21, the infantry unit of the Reserve Officers' Training Corps was converted into a cavalry unit.

The primary object of the Reserve Officers' Training Corps is to provide systematic military training at civil educational institutions, for the ultimate purpose of qualifying selected students of such institutions as reserve officers in the military forces of the United States. It is intended to attain this object during the time the students are pursuing their general or professional studies, with the least practicable interference with their civil careers, by employing methods designed to fit men physically, mentally and morally for pursuits of peace as well as war.

All candidates for a degree in a four-year course must take for two years at least three hours a week of military training.

Students in their junior and senior years, who are approved by the president and the professor of military science and tactics, may take the advanced course if they so elect. The advanced course consists of at least five hours per week and a summer camp of about six weeks during the summer vacation, between the junior and senior years. Students taking this course are paid by the Federal government at a rate to be fixed by the Secretary of War, not to exceed the value of the army ration. The rate now fixed is 40 cents per day, which amounts to about \$146 per year. Students graduating in the advanced course are eligible for commissions in the Officers' Reserve Corps, *but are not required to accept such commissions if offered.*

The required uniform is of olive drab woolen cloth, and is furnished for the use of the students by the Federal government without cost. It is worn by all cadets when on military duty. New uniforms are furnished each year.

The course for cavalry units of the Reserve Officers' Training Corps includes theoretical and practical instruction in all phases of cavalry work, so distributed over the four-year college course as to qualify students at the end of the freshman year as privates of cavalry; at the end of the sophomore year as non-commissioned officers of cavalry; and upon graduation as reserve officers. The instruction in this department covers cavalry drill, cavalry weapons, — *i.e.*, rifle, pistol, saber, automatic rifle and machine gun, — map reading and military sketching, minor tactics, equitation, etc. The course in equitation includes cross country riding and instruction in polo. So far as season and weather permit, instruction is of a practical nature out of doors.

Required Courses.

1. I.	2. II.	3. III.	Military Science and Tactics,	.	.	Freshmen.
25. I.	26. II.	27. III.	.	.	.	Sophomores.

Elective Courses.

50. I.	51. II.	52. III.	.	.	.	Juniors.
75. I.	76. II.	77. III.	.	.	.	Seniors.

Physical Education and Hygiene.

Professor HICKS, Assistant Professor GORE, Mrs. HICKS, Mr. GRAYSON, Mr. MANSELL, Mr. DERBY.

The purpose of the courses offered by this department is to provide active exercise and to instruct every student how to care for his health and maintain his physical condition while carrying on his college course.

The equipment consists of the Alumni Athletic Field, which has room for two football fields, a quarter-mile cinder track with a 220 straightaway, and the baseball diamond; and also the old field for class football and baseball, two tennis courts, and the drill hall floor for basket ball. For several years the drill hall floor was used for class work in gymnastics, but its condition has become so bad that this has been discontinued. During the winter months a hockey rink is provided on the college pond.

[All undergraduate male students are given a physical examination upon entering.]

MEN.

Required Courses.

1. I.	Hygiene,	.	.	.	.	Freshmen.
2. I.	3. III.	Recreation,	.	.	.	Freshmen.
25. I.	26. III.	Recreation,	.	.	.	Sophomores.

Elective Course.

77. III.	Training Course,	Seniors.
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WOMEN.

Required Courses.

4. I.	Recreation,	Freshmen.
5. II.	Gymnastics,	Freshmen.
6. III.	Recreation,	.	.	.	.	.	.	Freshmen.
27. I.	Recreation,	.	.	.	.	.	.	Sophomores.
28. II.	Gymnastics,	.	.	.	.	.	.	Sophomores.
29. III.	Recreation,	.	.	.	.	.	.	Sophomores.

Elective Courses.

50. II.	Gymnastics,	.	.	.	.	.	.	Juniors.
76. II.	Gymnastics,	.	.	.	.	.	.	Seniors.



Sophomore-Senior Hop Decorations

GENERAL INFORMATION.

A. FINANCIAL AND ADMINISTRATIVE.

Student Expenses.

TUITION.¹—Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of \$60 a year. The tuition charged persons not citizens of the United States is \$120 a year. Students entering from Massachusetts are required to file with the president a statement, signed by either town or city clerk, stating that the applicant's father is a legal resident of Massachusetts; a similar statement is required of those entering from other States.

All students entering the college for the first time as undergraduates or two-year students are charged a matriculation fee of \$5, which in event of a student leaving the institution shall, if all bills due the college are paid, be remitted, or which shall upon graduation be considered as payment for the diploma.

DORMITORIES AND BOARD.—The college has dormitory accommodations for about 62 men students. The rooms in the dormitories are occupied by the upper classmen. Hence new students find it necessary to room in private houses. The rooms in the college dormitories are unfurnished; for the most part they are arranged in suites of three, — one study room and two bedrooms. These rooms are heated by steam and lighted by electricity. They are cared for by students occupying them. The dormitory rent for each person varies from \$39 to \$66 a year. The rent for furnished rooms in private houses ranges from \$1 to \$4 a week for each occupant. Correspondence in regard to rooms should be addressed to the dean of the college.

Board may be obtained at the college dining hall. At present, the price of board there is \$7 a week.

Expenses.

The necessary college expenses are estimated as follows:—

Tuition: citizens of Massachusetts, free; other citizens of the United States, \$60 a year; foreigners, \$120 a year.

	Low.	High.
Matriculation fee, first year,	\$5 00	\$5 00
Room in college dormitories or in private houses,	39 00	110 00
Board, \$7 per week,	252 00	252 00
Laundry, 50 to 85 cents a week,	18 00	30 00
Laboratory fees,	5 00	25 00
Books, stationery and miscellaneous items,	31 00	53 00
	\$350 00	\$475 00

¹ This statement applies to those registering as regular or two-year students.

OTHER EXPENSES.—Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from \$15 to \$30 a year. Additional financial responsibility is also assumed by students joining a fraternity or entering into other social activities of the college. Students rooming in college dormitories are obliged to equip their own rooms with furniture. The college assumes no responsibility in regard to the safe keeping of student property either during the college term or vacations, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling, the economical student will probably spend between \$400 and \$500 per year.

INITIAL CHARGES.

At the opening of the college year, before students are registered in their classes, the following charges are payable at the treasurer's office:—

	Freshmen.	Sophomores.	Juniors and Seniors.
Matriculation fee,	\$5 00	—	—
Board (if at college dining hall) four weeks in advance,	28 00	\$28 00	\$28 00
Assessment for support of Social Union,	1 50	1 50	1 50
Laboratory fees,	5 00	5 00	2 00-10 00
Room rent (if in college dormitory),	—	—	12 00-20 00
Student tax for support of athletics, ¹	4 00	4 00	4 00
Student tax for support of non athletic activities, ¹ .	2 50	2 50	2 50

¹ While this is not essentially a college charge, the treasurer of the college acts as collector for the student activity, and all students are expected to make the payment as indicated. The subscription price of the "Collegian" is fixed by the managers; the amount of athletic tax by vote of the student body.

LABORATORY FEES.

The principles observed in establishing laboratory fees are the requirement that students pay for those materials actually used which cannot be supplied by the individual, and that the laboratory fees include a charge sufficient to guard against wanton waste and breakage.

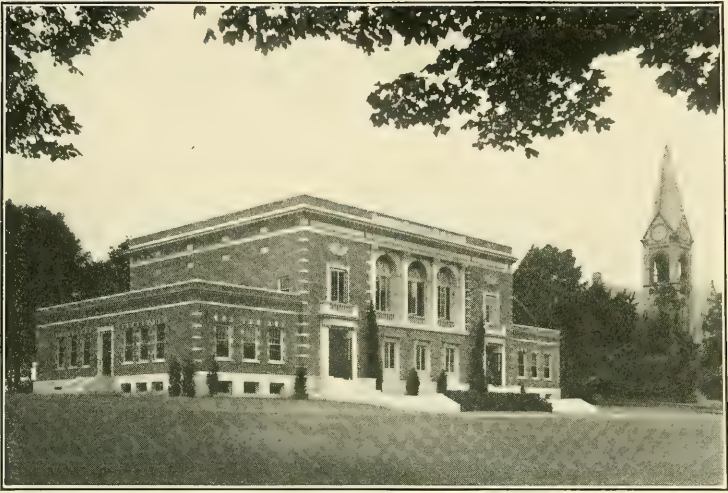
Student Aid.

SELF-HELP. — Many students are obliged to find work of some sort to earn their way through college. A few men have met their entire expenses in this manner, many more have paid a large part of their expenses, and many have earned a small proportion of the cost of their college education; but the college recommends that no new student enter without having at least \$150 and preferably \$250 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money, in the expectation of earning their way entirely. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in completing his college course, or, instead, to borrow money sufficient to carry him through. No student should undertake work that interferes with his studies, and students should understand that, owing to the large number of applications for employment, no one man can receive a large amount of work at the college. A number of students find opportunities for earning money without depending upon the college to furnish them with work.

So far as possible needy students will be employed in some department of the college. The divisions of agriculture and horticulture usually afford the most work, although there are several permanent janitorships available for students, and forty or more students are employed at the dining hall.

Application for student labor should be made directly to Kenyon L. Butterfield, president of the college. Applicants are required to present statements from parent or guardian and from a public official or other responsible person of the town or city in which they reside, explaining the necessity of the applicant's need of assistance. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor. The most desirable and responsible positions are naturally assigned to those needy students who have been in the institution longest and who have demonstrated their need and ability. Students, therefore, may find it rather difficult to obtain all the work they desire during their freshman year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

SPECIAL NOTICE TO NEEDY STUDENTS. — In the last few years the demand for paid labor on the part of new students has far exceeded the amount of employment that the college can offer. The college cannot promise work to any student, particularly to freshmen. It accordingly urges prospective students who are dependent entirely upon their own efforts not to undertake the course before they have earned enough money to carry them through, or nearly through, the first year.



Memorial Hall

Memorial Hall.

Soon after the close of the World War the alumni, students, faculty and friends of the college subscribed \$150,000 for the erection of a soldier memorial building to be placed on the college campus. This building was completed in the summer of 1921. It is designed to serve as headquarters for the student activities, and as the center of the social life of the institution.

In the basement are bowling alleys, pool tables, a store, post office and barber shop. On the main floor are eight offices for leaders of various student activities, a large reading room, and a beautiful memorial room in which is found the tablet bearing the names of the sons of the college who gave their lives in the great war. On the second floor is an auditorium seating 350 persons. This room is also used for college dances.

Student Accounts.

The following rules are enforced concerning student accounts: —

No student will be allowed to graduate until all bills due the institution from him are paid.

College charges, such as room rent, laboratory fees and tuition, must be paid in advance, at the beginning of each term. This rule is strictly adhered to, and no student will be allowed to complete his registration until such payments are made.

Every student boarding at Draper Hall is required to pay at the beginning of each term at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if at any time during the term he is more than one week in arrears in his payment for board.

All money due for student labor shall at the discretion of the treasurer of the college be applied on account toward any bills that a student may owe to the institution.

Student Relations.

The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standards of student deportment.

Any student known to be guilty of dishonest conduct or practice must be reported by the instructor to the president for discipline.

The privileges of the college may be withdrawn from any student at any time, if such action is deemed advisable.

It should be understood that the college, acting through its president or any administrative officer designated by him, distinctly reserves the right, not only to suspend or dismiss students, but also to name conditions under which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined but he may also be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences ("cuts"). According to the rules a student is allowed a certain percentage of absences from class and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet, if in the judgment of the college authorities a student is neglecting his work on account of these activities, the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct. Prospective students or their parents may, upon application, obtain a copy of the faculty rules governing student relations to the college.

Infirmary.

The college maintains an infirmary for the care of sick or injured students. The buildings now available for this purpose are quite inadequate for the needs of the institution, and it is hoped that in the near future other buildings of this kind may be erected and the general equipment somewhat amplified. At present two small buildings, built especially for hospital purposes, are used for the infirmary.

The following statement outlines the plan followed in the management of the infirmary with respect to students:—

MANAGEMENT OF THE INFIRMARY.

Supervision.

1. The infirmary is under the *general supervision* of Prof. Charles E. Marshall, who is designated as Supervisor of the Infirmary. Miss Grace Charman, the resident nurse, with Miss Marguerite Davis as assistant resident nurse, is in *immediate* charge of the infirmary.

Use of Infirmary.

2. Students are urged to go to the infirmary at any time that they are in need of the services rendered by the resident nurse or by a town physician. Inasmuch as the physical director gives special attention to all student diseases, it is to be expected that the majority of the students will go to the infirmary at his suggestion. This understanding, however, should in no way deter students from going to the infirmary voluntarily at any time.

General Health.

3. Students are urged to consult the physical director or the resident nurse immediately when signs of physical disorder appear. Severe attacks of cold or other forms of illness can usually be avoided if treatment is administered in the incipient stage. The purpose of the infirmary is to help maintain the general good health of the students, as well as to furnish a suitable place for professional attention in cases of severe illness or accident.

General Fee.

4. The infirmary fee will be at the rate of \$2 a day, and will be charged when one or more meals are obtained at the infirmary, or when the student remains at the infirmary for one or more nights. A nominal charge will be made to out-patients for miscellaneous treatment of a minor character.

Additional Expenses.

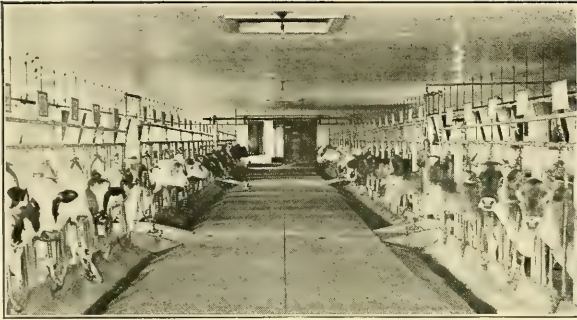
5. In addition to the fee charged, as specified in paragraph 4, the following additional expenses will be charged to the patient: —

(a) *Nurses.* — In case a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.

(b) *Professional Service.* — If a student requires medical attention by a physician, he will be required to select his physician and become responsible for fees charged by the physician.

(c) *Supplies.* — Special medical supplies prescribed by a physician or nurse will be charged to the patient.

(d) *Laundry.* — Expense for personal laundry incurred by students while in the infirmary will be charged to the individual student.



Interior of Dairy Barn

B. ACADEMIC AND DEPARTMENTAL.

Degrees.

Those who complete a four-year course receive the degree of bachelor of science. The fee for graduation from the college is \$5.

Graduate students who complete the assigned courses will receive the degree of master of science upon the payment of a fee of \$10. Credit may sometimes be allowed towards this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-year course of study, and present a satisfactory thesis, will be granted the degree of doctor of philosophy.

Those to whom degrees are awarded must present themselves in person at commencement to receive them. No honorary degrees are conferred.

The honorary fraternity of Phi Kappa Phi has a chapter at the agricultural college. Students are elected to membership to this fraternity on the basis of scholarship. Elections are made from the highest tenth of the senior class who have attained an average grade of at least 85 per cent during their college course.

Prizes.

Prizes are given annually in several departments for excellence in study or for other special achievement. Prizes offered in 1921 were:—

AGRICULTURE. — The Grinnell prizes, given by Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, for excellence in theoretical and practical agriculture. Three prizes, \$25, \$15, \$10. The contest is open to those senior students whose record on the registrar's books shows an average standing of 80 or above for the technical work taken in the Divisions of Agriculture and Horticulture during the junior and senior years.

BOTANY. — The Hills prizes, given by Henry F. Hills of Amherst, amount to \$35 annually. Competition is open to members of the senior, junior and sophomore classes as follows: for the best herbarium, \$20; for the second best herbarium, \$15. No collection deemed unworthy of a prize will be considered.

PUBLIC SPEAKING. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declamations in the Burnham contest, \$15 and \$10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, \$30 and \$15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, a gold medal and \$15. The preliminary contests in debate are open, under certain restrictions, to all regular students.

MILITARY. — Graduates of the Senior R. O. T. C. are eligible for commissions in the Officers' Reserve Corps of the United States Army.

TEACHERS' CERTIFICATES. — State teachers' certificates, authorizing teaching in State-aided high schools, are granted to those students who complete the required amount of work in the Department of Agricultural Education.

The Library.

The library — stack room, reading room and office — occupies the entire Chapel building. It contains about 70,000 catalogued volumes, several thousand volumes not catalogued, and a large number of bulletins, farm papers and other material, which is being put into good working order as fast as possible. Works on agriculture, horticulture, botany, entomology and the various sciences predominate, but literature, history and sociology are well represented and receive due attention. The reading room provides a good variety of popular and technical periodical literature, encyclopedias and general reference books.

The library is being reclassified and recatalogued, in order to make the splendid material accessible and of the greatest working value. Every effort is being made toward developing the college library into a vital intellectual center, of equal value to every student, teacher and teaching department on the college campus. Consequently only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and department are enforced. An agricultural reference library is maintained in Stockbridge Hall, and department libraries are also maintained in some of the other buildings on the campus.

Occasional lectures are given to regular and short-course students, in order to make the best use of the library equipment. Emphasis is laid upon the

card catalogue, periodical indexes, bibliographies and guides, and the large collections of United States Department of Agriculture and experiment station literature.

Library hours are from 8 A.M. to 9.30 P.M. every week day, and from 9 A.M. to 1.30 P.M. on Sundays in term time. Shorter hours prevail during vacation.

Student Activities.

Student government is vested in the College Senate, composed of elected representatives of the junior and senior classes. The Senate serves as a general director of undergraduate conduct, regulates interclass and other college activities, and represents, before the faculty, the interests of the student body.

All examinations are conducted under the honor system, which is administered by the student Honor Council. Like the Senate, this council is a popularly elected body, with representatives from the senior, junior, and sophomore classes.

The Social Union Committee is appointed by the Senate, has a Senate chairman, and supervises the entertainments that are given throughout the year for faculty and students. All students become members of the union by paying a small fee at the time of registration.

The Informal Committee — likewise a Senate committee — has direction of the informal college dances held frequently throughout the year.

The Young Men's Christian Association, Catholic Club, and Menorah Society are active religiously.

Various departments have organized clubs. At the regular meetings, addresses are made by men prominent in the particular line of work represented by the club, and discussion is carried on. Frequently two of the clubs have an open debate. The clubs now organized are agricultural economics, pomology, poultry, chemistry, animal husbandry, floriculture, and landscape gardening.

Judging teams are supported by several of these clubs. The teams now representing the college are fruit, stock, and poultry judging. In recent years several members of the stock-judging teams have received scholarships for their excellent work, and the teams have ranked well with other colleges. The fruit-judging team of 1921-22 won the New England championship at Concord, N. H., and the national championship at the National Fruit Show in Toledo. Activities of this nature have an educational value to the student.

Athletics.

College spirit is built largely around intercollegiate activities. Athletics, representing these relationships, are not only beneficial to the college, but are also of value to the participants. They are a part of the training of a college man. On the athletic field the student learns to take knocks, to think and to act quickly, and to work with other men.

At M. A. C. the varsity sports are football, baseball, hockey, basket ball, and track. Under the system of management the general governing body is a board composed of faculty, alumni, and student representatives. A head coach supervises all sports, and personally coaches football, basket ball, and baseball.

The following table gives a summary of the teams appearing more than twice in one sport on the schedule of M. A. C. major sports for the years 1919-22, inclusive:—

COLLEGE.	Football. ¹	Basket Ball.	Baseball. ²	Hockey.	Track Relay Cross Country. ²
Amherst,	2	5	6	4	1
Bates,	3	—	1	—	—
Boston College,	—	—	—	2	—
Boston University,	—	—	2	1	—
Colby,	—	—	2	—	—
Connecticut Aggie,	4	8	4	—	—
Dartmouth,	—	1	1	4	—
Harvard,	—	2	1	2	—
Massachusetts Institute of Technology,	—	6	—	2	—
Middlebury,	—	2	1	1	1
New Hampshire,	4	6	2	—	8
Pratt,	—	3	—	—	—
Rensselaer,	—	2	—	—	—
Rhode Island,	3	1	3	—	1
Springfield,	2	2	4	—	3
St. Lawrence,	—	2	—	—	—
Stevens,	1	6	2	—	—
Trinity,	—	1	2	—	1
Tufts,	4	5	2	1	—
University of Vermont,	3	3	3	—	2
Wentworth,	—	2	—	—	—
Wesleyan,	—	3	1	—	—
Worcester Polytechnic Institute,	4	5	4	—	5

¹ Includes 1922.

² Does not include 1922 schedule.

Besides these major sports a polo team, indoor and outdoor rifle teams, and a pistol team are conducted by the Military Department.

The pistol team's first season in 1921 resulted in victories over Alabama Institute of Technology, Norwich, and Harvard, with no defeats. The polo team has been organized only recently. The indoor and outdoor rifle teams hold enviable records in the intercollegiate long-time matches, having secured three legs on the indoor trophy, tying with Michigan Agricultural College, and four legs on the outdoor trophy, no other college having won more than one.

Interclass athletics are carried on in all major sports and in tennis and indoor rifle shooting. Every student at M. A. C. is encouraged by the Physical Education Department to participate in some athletic sport, either on varsity, class, fraternity, or other group teams.



Baseball Team, 1921

Non-athletics.

Every student is expected to take some part in student activities. For those literarily inclined there are three student publications which afford adequate opportunity for the expression of their abilities. The "Collegian" is a weekly newspaper devoted to campus news. The "Index" is a college annual published each year by the junior class. The "Squib" is a humorous periodical issued by the "wits" among the student body.

Of course, there are other students who are musical by nature, and their talents are well expressed in the Glee Club and orchestra. These organiza-

tions not only furnish music at college affairs, but give concerts at various places throughout the State. Annually, on a trip to Boston and vicinity, an alumni concert and dance is held in Boston, and concerts are given in neighboring localities. A band is organized in connection with the Military Department.

Actors of ability constitute the Roister Doister Dramatic Association. Several plays, including original productions of the students, are staged each year



Class Day

by this society. The association also assumes direction of student sketches and class plays. Under its guidance plays of superior quality have been produced.

Opportunity is also found for oratory and debating. Varsity debates are held with various colleges, and a freshman-sophomore interclass debate is an annual affair. The annual Burnham declamation contest is open to members of the two lower classes. The Flint oratorical contest, likewise an annual event, is open to all members of the student body. Oratory and debating are under the management of the Public Speaking Council, composed of representatives of the three upper classes, together with the student and faculty managers.

These activities are all governed by the Non-athletic Activities Board, a council composed of faculty, alumni, and student representatives.

PUBLIC DOCUMENT

No. 31

MASSACHUSETTS
AGRICULTURAL COLLEGE

REPORT OF THE PRESIDENT
AND OTHER OFFICERS OF
ADMINISTRATION



1921



THE M. A. C. BULLETIN AMHERST, MASSACHUSETTS

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THE FIFTY-NINTH ANNUAL REPORT OF THE MASSACHUSETTS AGRICULTURAL COLLEGE

PART I.—THE REPORT OF THE PRESIDENT
AND OTHER OFFICERS OF ADMINISTRATION
FOR THE FISCAL YEAR ENDED NOV. 30, 1921



DEPARTMENT OF EDUCATION
THE COMMONWEALTH OF MASSACHUSETTS

PUBLICATION OF THIS DOCUMENT
APPROVED BY THE
SUPERVISOR OF ADMINISTRATION.

The Commonwealth of Massachusetts

DEPARTMENT OF EDUCATION, BOSTON, Jan. 31, 1922.

To the Honorable Senate and House of Representatives.

GENTLEMEN:— In accordance with the provisions of section 8 of chapter 75 of the General Laws, I transmit to you herewith, for the use of the General Court, the annual report of the Massachusetts Agricultural College for the year ending Nov. 30, 1921.

Respectfully yours,

PAYSON SMITH,
Commissioner of Education.

The Commonwealth of Massachusetts

MASSACHUSETTS AGRICULTURAL COLLEGE,
AMHERST, NOV. 30, 1921.

To the Commissioner of Education.

SIR: — On behalf of the trustees of the Massachusetts Agricultural College I have the honor to transmit herewith Part I of the fifty-ninth annual report of the trustees, for the fiscal year ended Nov. 30, 1921, this being the report of the president of the college and other officers of administration to the corporation.

Respectfully yours,

EDWARD M. LEWIS,
Acting President.

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REPORT OF THE PRESIDENT OF THE COLLEGE.

Gentlemen of the Corporation.

On account of the absence of President Butterfield it becomes my duty to present to you the annual report of the President of the Massachusetts Agricultural College for the year ending Nov. 30, 1921, and to transmit with it the annual reports of other administrative officers of the institution.

REVIEW OF THE YEAR.

President Butterfield's Absence.

In July President Butterfield was invited to become a member of a commission organized by the Board of Foreign Missions of North America to study the educational needs of China. The commission, composed of a number of leading educators of America, was requested to spend from four to five months in making a comprehensive study of the educational needs of China and to prepare a report embodying its conclusions and recommendations. The President, whose vision, national leadership, and ability as an investigator have long been recognized, was asked to join the commission as a specialist in industrial and agricultural education. Your Board granted him a leave of absence for six months, and on August 12 he left Amherst for service on this important commission. He is expected to return in February, 1922.

Change in Trustees.

The term of Mr. Edmund Mortimer as trustee of the College expired Dec. 31, 1920. Having moved to another State, Mr. Mortimer was not eligible for reappointment, and Governor Cox chose as his successor Mr. Atherton Clark of Boston. Mr. Clark is a son of Ex-President William S. Clark, one of the early and most distinguished presidents of the College. He is a graduate of the College in the class of 1877, and a

prominent business man in Boston. He has been an active leader among the alumni, having served as president of the Associate Alumni and as chairman of the building committee which had charge of the financing and constructing of Memorial Hall. The appointment of Mr. Clark was not only most appropriate but also most acceptable to the many friends and supporters of the College.

Resignations.

During the year there have been seventeen resignations from the professional staff, twenty-one from the clerical and secretarial staff, and three from other salaried positions. Among these resignations are those of Mr. Charles R. Green, librarian, and Robert J. Sprague, professor of economics and sociology.

Mr. Green came to the College in 1908, and during his administration the library service was organized on a high plane of efficiency. The total number of books was increased four-fold. The second floor of the chapel building was recently fitted as an additional reading and study room, and has proved to be an important addition to the library facilities. The need of a new and adequate library building has been for many years, as you know, very pressing, and during the past few years the demands for such a building have increased tremendously. Partly because of our inability to secure a legislative appropriation for a new library, and partly because of uncertainty relative to salary adjustments recommended by the trustees, Mr. Green felt that it would be the part of wisdom for him to accept a position as librarian of the Jones Library, Inc., of Amherst. He gave thirteen years of excellent service to the College and will be greatly missed. I am sure he carries to his new position the best wishes of his many friends and colleagues on the faculty.

Prof. Robert J. Sprague was head of the Division of the Humanities, and had served the institution since 1911. He organized the Department of Economics and Sociology, and taught practically all of the courses in that important field. In 1920-21 he was on leave of absence to engage in educational work at Rollins College, Florida. He has returned to that work this year. Uncertainty as to the future here was a con-

tributing cause to his withdrawal also. Dr. Sprague was a helpful and inspiring teacher. He rendered a fine service and will be greatly missed by both his colleagues on the faculty and by the students.

New Appointments as Department Heads.

Mr. Henry S. Green has been chosen librarian to succeed Mr. Charles R. Green. Mr. Green is a graduate of Yale University. He received the degree of LL.D. in 1900 from Bethany College; has had a long and successful teaching experience, both at Bethany College and at the University of West Virginia; has served as State Librarian of West Virginia, and for the last four years has been in library work connected with the army.

Enrollment of Students.

In the Regular Courses. — This autumn the registration of students in work of collegiate grade is 546, an increase of 40 over 1920. The entering class numbers 162 as compared with 135 in 1920, and 125 in 1919. The number of graduate students is somewhat larger as is also the number enrolled in the sophomore class. There are 13 special students as compared with 23 enrolled a year ago. In the four-year course there are 472 students as compared with 445 enrolled in these courses in 1920. The total number of women students has increased from 37 in 1920 to 48 in 1921; 15 of these entered with the freshman class.

In the Two-year Course. — There is a slight increase in the enrollment of students in the two-year course. In 1920 the total was 277, and in 1921 the total is 293. It is gratifying to note that there are nearly as many students enrolled in the second year of the two-year course as entered a year ago. There are 55 students enrolled in the vocational poultry course and unit courses as compared with 69 in 1920. Of the total registration of 348, 14 are women.

In the Summer School and Other Short Courses. — The Summer School of 1921 brought to the College as large a number of students as was enrolled in 1920, the Summer School registration being 259. The Winter School enrollment of 1920 showed a substantial reduction over that of 1919.

Disabled Soldiers as Students. — During the year the College has continued to co-operate with the Federal Board for Vocational Education (recently taken over by the Veteran's Bureau) in the training of a large number of disabled soldiers and sailors desiring education in agriculture. At the close of the College year 194 men are enrolled at the College under provisions of the contract with the government; 36 of these are enrolled in courses especially organized for the Federal Board men, and the remainder are enrolled in existing courses.

Total Enrollment. — The total enrollment at the present time is 894, of whom 546 are enrolled in work of college grade and 348 in the various short courses. During the year the total number of students registering at the College for one course or another, including the classes graduated in June from the four-year and two-year courses, has been approximately 1,500.

Salary Increases.

Following the legislative appropriation for salaries made in the spring of 1921 the trustees of the College presented a schedule for salary increases to the Supervisor of Administration. Some of these were in the nature of the usual normal increases, and some were in order to remedy inequalities which your Board felt had inevitably arisen from time to time in the effort to make fair adjustments between individuals. Although most of them were readily granted *in toto*, there was a number of these requested increases granted only in part. The result of the latter, in my judgment, was rather unfortunate, because the inequalities still remain with us, at least some of them. Due to the inability of the trustees to utilize funds available for salary increases, I am obliged to report that a substantial balance remains unexpended at the end of this fiscal year.

Relationships with Other State Departments.

Because of the seriousness of the situation and its potential danger to the welfare of the institution, I cannot refrain from calling attention again to the restlessness which still continues here, owing to the uncertainty and division of the final authority. That the trustees no longer control, as they formerly

did, or manage the institution, is indeed quite evident. Unless some relief can be found from the present arrangement, unless a definite and clear one replace the indefinite and *divided* one of the present, it does not seem possible that the morale of the College can much longer be maintained on its former high level of efficiency.

Co-operation of Alumni.

In his report of a year ago President Butterfield referred to the fact that the alumni were rallying to the support of the College as never before. Further evidences of this fact have accumulated during the year. Not only did an unusually large number of alumni return for the semi-centennial celebration in June, but the business session of the alumni held at that time was in many ways an unmistakable expression of the new and the intense interest in the College evidenced by the alumni everywhere to-day. Thorough and comprehensive reports were received from the alumni committees that during the preceding months had been considering the following vital questions: (a) the administrative policy and relations of the College; (b) the question of student life and government; and (c) the question of the course of study. The committee dealing with the latter subject made only a partial report. During the summer and fall months this committee, of which Mr. H. J. Baker, 1911, is chairman, has devoted a large amount of time in the continuation of their inquiry among alumni and others who are in a position to make valuable contributions to this study. The final report of this committee has not yet been submitted.

War History.

Just prior to the June Commencement there was published the history of the "Massachusetts Agricultural College in the War," the records for which had been compiled by the secretary of the College with much labor and care. The many letters of appreciation and commendation of this history indicate that the time and expense involved in its publication were amply justified.

Change in the College Catalogue.

I wish here to call your attention to a change in the publication of the College catalogue for this year and the reasons therefor.

The College catalogue is desired largely by three distinct groups of readers: first, it is desired by resident students who are interested primarily in the detailed character of the courses of study; second, by prospective students and parents who are especially interested in the entrance requirements, subjects offered, and information concerning expenses, living accommodations, and questions relating to other phases of student life; third, by individuals and institutions that desire a complete record in permanent form of the organizations of the Collège and the complete list of courses offered each year.

Formerly an edition of from 6,000 to 8,000 copies of the complete catalogue has been issued and has been sent to all groups alike. Believing that two of the groups could be better served otherwise, without increasing the total expense of publication, the following modifications will take the place of the single complete edition of the catalogue.

A relatively small edition of the complete catalogue of 1921-22 will be published; this will be distributed to members of the faculty, to high schools, to other colleges and universities, and to any other individual or institution whose requests can be most satisfactorily met by a complete catalogue. A detailed description of the courses will be printed separately; this will be for distribution among the students. For distribution among prospective students and others inquiring about the educational advantages of the College, an abridged and illustrated catalogue will be published; this will contain certain material printed in the catalogue, such as the requirements for admission, outline of the course of study and general information concerning expenses. The pamphlet will be illustrated by interesting views of the College buildings and campus, and the text will contain further information designed to advise prospective students more fully than does the usual catalogue, concerning the educational advantages and student life at the College.

Student Labor.

In 1915 the faculty committee on employment, consisting of Professor Sears, Professor Haskell and Treasurer Kenney directed its attention to developing a system whereby, through interviewing applicants for student labor and making inquiries of their parents and others concerning their financial condition, a fairly intelligent estimate might be gained as to the men who should be given consideration in the assignment of work at the dining hall and elsewhere on the campus. Prior to this time there had been no method devised for the satisfactory distribution of positions, and frequently students were given lucrative employment who did not greatly need such assistance. At the same time a number of needy and deserving students were making great sacrifices, and, indeed, undergoing privations in order to remain in College. It not infrequently happened that a student of this type was obliged to leave College because of his inability to secure the labor which would have made it possible for him to continue.

The work of this committee has progressed from year to year; the task of interviewing fifty or sixty men each year and classifying them is in many ways a burdensome one. On the other hand, the results obtained seem fully to justify this necessary expenditure of valuable time. The secretary of the committee has made an analysis of the amounts earned by students during the last College year, and a summary of this study is here given: —

Student Labor, September, 1920, to June, 1921.

	Number of Students.	Amount earned.
Less than \$50	210	\$2,560 14
Seniors	23	\$323 78
Juniors	22	427 73
Sophomores	30	326 04
Freshmen	49	457 35
Two year	75	858 91
Miscellaneous	11	166 33
\$50 to \$100	24	1,750 02
Seniors	8	\$576 02
Juniors	7	486 49
Sophomores	3	255 15
Freshmen	4	315 67
Two year	2	116 69

Student Labor, September, 1920, to June, 1921 — Concluded.

	Number of Students.	Amount earned.
\$100 to \$200	41	\$6,219 09
Seniors	9	\$1,250 45
Juniors	7	1,120 97
Sophomores	16	2,538 09
Freshmen	5	723 50
Two year	2	286 05
Miscellaneous	2	300 03
Over \$200	65	17,646 83
Seniors	23	\$6,327 92
Juniors	24	6,697 91
Sophomores	8	2,013 26
Freshmen	1	239 46
Two year	7	1,850 04
Miscellaneous	2	513 24
Total	340	28,176 08

Legislative Appropriations, 1921.

The trustees asked for special appropriations in the budget of the year for several items, including a chemistry building. An appropriation for this building was favored by the Supervisor of Administration, the joint committee on ways and means, and the House of Representatives. The Senate, however, voted to eliminate this from the budget. The only special appropriations granted, therefore, were \$25,000 for improvements and equipment and \$10,000 for the administration building at the Market-Garden Field Station. For details of the budget, I would call your attention to the budget on page 74.

On account of our failure to get the special appropriations requested, and also on account of the sum allowed for improvements and new equipment, the building operations during the year have been on a minimum basis. The principal improvement was a small addition to the barn for the housing of live stock. The administration building at the Market-Garden Field Station has been completed.

Memorial Hall.

Formal recognition should here be made of the gift to the College of the beautiful Memorial Hall erected by the students, alumni, faculty and friends of the College, which was completed and dedicated in June. The building has been transferred to the trustees by the following deed of gift:—

This indenture, made this day of nineteen hundred and twenty-one, between the Associate Alumni of the Massachusetts Agricultural College, a corporation duly organized (hereinafter called "the donor"), and the Commonwealth of Massachusetts, by

trustees of the State institution, the Massachusetts Agricultural College, acting under and by virtue of chapter 262 of the General Acts of 1918 (hereinafter called "the board of trustees"), Witnesseth:

In consideration of the high regard and feelings of gratitude which the members of the said corporation bear towards said College, and as a memorial to the graduates and students of the College who gave their lives in the struggle for democracy in the World War, and in further consideration of one dollar and other valuable considerations paid by the board of trustees, the receipt whereof is hereby acknowledged, the donor does hereby give, grant, bargain, sell and convey unto the said board of trustees, its successors and assigns, a certain memorial building on the land of the Massachusetts Agricultural College situated in Amherst, in the county of Hampshire and Commonwealth of Massachusetts. The said building to be donated complete and free from all encumbrances.

This indenture is made upon the following terms and conditions: That the board of trustees will accept and maintain the said memorial building in a proper and usable condition for student activities, subject to the rules and regulations of said board, as provided for in the agreement between the donor and said board of trustees appearing in the records of the donor June 19, 1920, and in the records of said board of trustees, January 7, 1921, creating the Board of Management of Memorial Hall, and will insure and keep insured the said memorial building from loss or damage by fire.

To have and to hold the granted building, with all the privileges and appurtenances thereto belonging, to the said Commonwealth of Massachusetts, its successors and assigns, to their own use and behoof forever.

In witness whereof, the parties to this indenture have hereunto set their hands and seals, the Commonwealth by the Trustees of the Massachusetts Agricultural College, who incur no personal liability by reason of the execution hereof or anything herein contained, except as hereinabove set out, this day of , nineteen hundred and twenty-one.

THE ASSOCIATE ALUMNI OF THE
MASSACHUSETTS AGRICULTURAL COLLEGE.

By:.....

THE COMMONWEALTH OF MASSACHUSETTS.

By:.....
.....
.....

Trustees of the Massachusetts Agricultural College.

Departments of Undergraduate Instruction.

Although still somewhat handicapped by the unsettled conditions incident to the necessary reconstruction due to the war, I am glad to say that a reasonable degree of stability has been reached in all departments of the institution. On the other hand, practically every department is suffering from the loss of valuable and experienced teachers who have, during the past three years, resigned to accept more attractive positions elsewhere. Some positions long vacant have been filled during the year. In general, it may be said that the large numbers of two-year students have resulted in the further crowding of quarters, in many cases already insufficient for four-year men. Many departments are also handicapped by limited equipment and by inadequately trained teachers.

All expansion in personnel during the past two years has been limited to the addition of a few instructors in the Divisions of Agriculture and Horticulture.

Library.

Little can be said concerning the work of the library for the past year other than has been reported in former years. The fitting up of the second floor of the library building for reading room purposes has added somewhat to the facilities for study at the library. The library, however, is still most inadequate and unsatisfactory from the standpoint of economy in operation and its use as an educational center for the entire student body. Students and faculty alike feel very keenly the inadequacy of these facilities, and realize the hopelessness of securing satisfactory results from the library so long as existing conditions continue.

Infirmary.

Dr. Marshall, who has general charge of the infirmary, calls attention to the additional problems confronting the institution with respect to proper accommodations for the sick because of the large number of students which we now have, and also because of the fact that women are attending the College in larger numbers than formerly. A suitable infirmary which will provide accommodations for both men and women students seems imperative.

Department of Physical Education.

The work of the Department of Physical Education has continued along the lines already established. The department is now well equipped with respect to instructors, but because we have no gymnasium no indoor work in physical education can be undertaken other than that made possible by basketball.

Department of Military Science and Tactics.

The introduction of the cavalry unit for the R. O. T. C., seems to have been a wise and helpful move. While military drill at this institution cannot now be said to be popular with the students, it is less objectionable than during the past year or two. The number of men electing the advanced work in military drill is small. This number is likely to increase, however, as the natural prejudice against military training now shared by the country at large wears away and the advantages of the instruction becomes clearer to our students.

During the year Col. Richard W. Walker, who for two years had been the Commandant in charge of our military instruction, was transferred to another post, and his position here has been filled by Maj. Frederick E. Shnyder. Associated with Maj. Shnyder are Maj. Herman Kobbe, Capt. Thomas Brady and Capt. James V. V. Shufelt.

Semi-Centennial and Commencement.

The celebration of the Semi-Centennial of the College extended from July, 1920, until June, 1921. The following "Year of Jubilee" meetings were held at the College on the dates specified: —

- June 30–July 2, 1920. Association of Agricultural College Editors.
- Oct. 7–8, 1920. Conference of Women in Agriculture and Country Life.
- Oct. 14–16, 1920. American Civic Association. — Country Planning Conference.
- Oct. 15, 1920. American Country Life Association.
- Oct. 22, 1920. Association of Land Grant Colleges.
- Oct. 30, 1920. Luncheon to Ex-President James C. Greenough.
- April 8–10, 1921. International Association of Agricultural Missions.
- May 15, 1921. Rural Clergymen's Conference.

The final and crowning event of the "Year of Jubilee," of course, was the Commencement in June. The programs of the various events of Commencement are here given:—

GENERAL PROGRAM, JUNE 10 TO 14, 1921.

Friday, June 10, Citizens' Day.

- 10.00 A.M. Alumni Field: Faculty-Senior baseball game.
3.00 P.M. Auditorium Tent: Addresses by Governor CHANNING H. COX, Dr. ARTHUR W. GILBERT, Massachusetts Commissioner of Agriculture, and Hon. HENRY C. WALLACE, Federal Secretary of Agriculture.
6.45 P.M. Steps of Stockbridge Hall: Interclass sing.
8.00 P.M. Bowker Auditorium: Dramatics—First performance of "John Epps," a historical play of M. A. C. in the days of '71, written by FRANK PRENTICE RAND of the English Department.

Saturday, June 11, Alumni Day.

- 9.00 A.M. Memorial Hall: Meeting of Associate Alumni—Address by President BUTTERFIELD to the alumni; report of memorial building committee; general business.
1.00 P.M. Auditorium Tent: Alumni dinner.
3.00 P.M. Alumni parade and frolic.
4.00 P.M. Alumni Field: Baseball game, M. A. C. v. Amherst.
7.00 P.M. Green in front of South College: Lawn fête and concert by 104th Regiment Band.
9.00 P.M. Fraternity reunions.

Sunday, June 12, Dedication Day.

- 10.30 A.M. Auditorium Tent: Semi-Centennial Address and Baccalaureate by President BUTTERFIELD.
3.00 P.M. Memorial Hall: Dedication of Memorial Hall.
6.00 P.M. Rhododendron Garden: Reception by President and trustees.

Monday, June 13, Anniversary Day.

- 8.30 A.M. Dining Hall: Breakfast for alumni "M" men, and former leaders in non-athletics.
10.30 A.M. Senior fence: Senior Class Day exercises.
1.30 P.M. Junior frolic.
2.30 P.M. Auditorium Tent: Anniversary meeting, alumni, students and faculty participating.
4.30 P.M. Alumni Field: Freshman-Sophomore baseball game.
8.00 P.M. Bowker Auditorium: Dramatics—second performance of "John Epps."

Tuesday, June 14, Commencement Day.

- 10.30 A.M. Auditorium Tent: Commencement exercises — Speakers:
Mr. E. E. THOMPSON, '71, secretary of the class; President
WINTHROP E. STONE, '82, of Purdue University; Mr.
J. H. PUTNAM, '94, County Agent for Franklin County,
Massachusetts; and Dr. PAYSON SMITH, Commissioner of
Education for Massachusetts.
- 8.00 P.M. Memorial Hall: Sophomore-Senior hop.

PROGRAM FOR CITIZENS' DAY, JUNE 10.

Hon. CHARLES A. GLEASON, Vice-President and Chairman,
Board of Trustees, presiding.

Music.
Address.
His Excellency Governor CHANNING H. COX.

Music.
Address.
Dr. ARTHUR W. GILBERT of the Class of 1904,
State Commissioner of Agriculture.

Music.
Address.
Hon. HENRY C. WALLACE,
Secretary of Agriculture.

Music.

Music for this occasion furnished by the Sophomore Quintet, composed
of —

ROBERT D. FULLER (Leader)	. . . . .	<i>Clarinet.</i>
DONALD G. NOWERS	. . . . .	<i>'Cello.</i>
HARRY C. NORCROSS	. . . . .	<i>Violin.</i>
FRED G. SEARS, Jr.	. . . . .	<i>Violin.</i>
Richard G. Wendell	. . . . .	<i>Piano.</i>

PROGRAM FOR BACCALAUREATE SUNDAY, JUNE 12.

Prelude and Processional.
Hymn: "Faith of Our Fathers."
Scripture Reading and Prayer.

Mr. CHARLES H. WHITE of the Class of 1909.

Music.
Semi-Centennial Address and Baccalaureate: "Our College and the
Common Weal."
President KENYON L. BUTTERFIELD.

Hymn: "America, the Beautiful."
Recessional and Postlude.

Music for this occasion furnished by the Sophomore Quintet..

PROGRAM FOR DEDICATION OF MEMORIAL HALL, JUNE 12.

President KENYON L. BUTTERFIELD, presiding.

Music.

Address.

Maj.-Gen. WILLIAM M. WRIGHT, U. S. A.
(Read by Dr. J. B. LINDSEY of the class of 1883.)

Music.

Address.

Dr. JOEL E. GOLDTHWAIT of the Class of 1885.

Dedication Address.

Dean EDWARD M. LEWIS.

Music.

Presentation of the Building to the College.

Mr. EVAN F. RICHARDSON of the Class of 1887,
President of the Associate Alumni.

Acceptance of the Building in Behalf of the Trustees.

Mr. WILLIAM WHEELER of the Class of 1871.

Hymn: "America."

Music for this occasion furnished by the Sophomore Quintet.

PROGRAM FOR ANNIVERSARY DAY, JUNE 13.

HERBERT J. BAKER of the Class of 1911, Presiding.

Music.

College Orchestra.

Songs.

Led by Glee Club.

Educational Development of M. A. C. in Fifty Years.

Prof. FRANK A. WAUGH, Head of Division of Horticulture;
Chairman, Committee on Semi-Centennial.

Development of Student Life of M. A. C. in Fifty Years.

Mr. NATHAN W. GILLETTE of the Class of 1921.

Song.

Glee Club Quartette.

Fifty Years of Athletics.

Mr. WILLARD A. MUNSON of the Class of 1905.

Song.

Glee Club.

Work of Alumni at M. A. C. in Fifty Years' Development.

Mr. ALLISTER F. MACDOUGALL of the Class of 1913, Extension
Professor of Farm Management.

M. A. C. — The College of the Future.

President KENYON L. BUTTERFIELD.

"Sons of Old Massachusetts."

PROGRAM FOR COMMENCEMENT EXERCISES, JUNE 14.

Music.

Prayer.

Rev. HERBERT J. WHITE of the Class of 1887.

1871-1921.

Responses:

For the Commonwealth — Dr. PAYSON SMITH, Commissioner of Education.

For the Land Grant Colleges of the United States — Dr. WINTHROP E. STONE of the Class of 1882, President of Purdue University, Lafayette, Ind.

For the Farmers of Massachusetts — Mr. JOSEPH H. PUTNAM of the Class of 1894, Agricultural Agent for Franklin County.

For the Class of 1871 — Mr. EDGAR E. THOMPSON, Secretary of the Class.

Music.

Conferring of Degrees.

President KENYON L. BUTTERFIELD.

Presentation of Diplomas.

Dr. PAYSON SMITH,
Commissioner of Education.

Announcement of Prizes and Awards.

Music.

Music for this occasion furnished by the Sophomore Quintet.

It should be noted that this was essentially an M. A. C. celebration. With one exception all the addresses were made by M. A. C. men. The music for the various programs was furnished by the students of the College. Approximately eight hundred alumni and former students returned for this Old Home Reunion. This is by far the largest number of M. A. C.

alumni and former students ever gathered together at one time. The dedication of the Memorial Hall constituted the principal feature of the program. All the meetings and functions were well attended, and the prevailing opinion was that the fiftieth anniversary of the graduation of the first class of the College, as well as the half century of service by the institution in the interest of agriculture and rural life in the State and Nation, was fittingly and appropriately observed.

On Commencement Day the degree of Bachelor of Science was conferred upon ninety-two men and three women; the degree of Master of Science upon three men; and the degree of Doctor of Philosophy upon one man.

The Market-Garden Field Station.

An increased interest in the work of the Market-Garden Field Station, noted by more visits from market gardeners than in 1920; 600 people in attendance at the annual Field Day on August 3, and a continuous series of requests from various sections of the State and other States as to the progress of the work, all give reason to believe that real service is being rendered to vegetable-growing interests.

The interest and co-operation on the part of the county agents throughout the State has been exceedingly gratifying and helpful in extending the work of the Market-Garden Field Station.

Projects under way were indicated in the last report to the President. To these can be added:—

1. A special study of the new annual sweet clover known as "Hubam," to learn its value as a soil improvement crop for the market vegetable grower.

2. The study being made of Washington asparagus, accepted as the best variety known.

The work of vegetable seed production to stress the opportunity and prove the value of home-grown seed has been of particular interest and value.

The Administration Building, for which an appropriation was made by the Legislature of 1921, has been completed. The completion of this building finishes the original program for construction as drafted in 1915. No major construction is contemplated for the future.

A request has been made for a vegetable storage building to cost about \$2,000, and for fencing to cost about the same amount. The latter is most pressing, for trespassing renders some of the experimental work of little value.

Splendid co-operation has been received from various departments of the College. Work along insect control lines has been badly handicapped due to lack of funds. The work of plant disease control investigation has made good progress.

The best progress of the work awaits needed assistance in both the experimental and extension fields.

The Mount Toby Demonstration Forest.

The Mount Toby Demonstration Forest was acquired to serve as a laboratory for the field work of forestry students in the College, and to exemplify, for all who might be interested, the various practices of forestry.

The forest is most admirably suited to its purpose. Owing to marked variations in soil, exposure, and elevation, it contains within its 750 acres a wide representation of common New England forest types, — white pine, hemlock, hardwoods, and varying mixtures of these. And owing to its very favorable location with respect to markets, its products can be disposed of in large or small quantities down to the last limb. Furthermore, the commanding view from the mountain top and the unspoiled attractiveness of the countryside around have made Mount Toby for many years a pleasure ground for out-of-door people, who are thus brought within reach of its forestry lessons; and the steel fire lookout tower soon to be set up on the summit will bring it still closer to the public.

The Forestry Department of the College, in taking charge of the forest, was faced at the outset with the heavy damage caused by the chestnut blight, and this damage has been until a few months ago the dominant and determining factor in the management. The forest contained not only several fine blocks of pure chestnut, but a great many scattered specimens in mixture with other species; and all were doomed by the disease, for which no remedy has anywhere been found. Year after year all available funds have had to be concentrated on salvaging

dying chestnut, in the form of telephone poles, ties, fence-posts, lumber, and cordwood.

The past year has seen practically the last of the chestnut removed. During the year (1921) there have been cut over 700 telephone poles, 35,000 feet of chestnut plank, and corresponding quantities of smaller chestnut products. With these out of the way it has been possible for the first time to turn to forestry in the ordinarily accepted sense of the word, and to accomplish some tasks that had long been awaiting their turn.

The first of these tasks was a cutting in the pine belt at the foot of the mountain, which removed all pines that were dying or just dead through competition with more vigorous neighboring pines. This operation, without reducing the growing stock, yielded 100,000 board feet at a clear profit of \$6 per thousand, together with 50 cords of limbwood at a clear profit of 25 cents a cord. The second of these jobs was the clearing of gray birch from a 12-acre area, to release a fine undergrowth of pine that would otherwise have died out. The yield was about 100 cords of wood at a net return of around 50 cents a cord; and there was left a splendid young stand of pine freed for vigorous growth. Similar release cuttings have been applied to 10 other scattered acres that were in like need, with similar promise of pure pine stands where there would otherwise have been only a short-lived growth of inferior hardwood; also a block of young pine has been thinned and pruned. These cuttings are of just the sort that should be carried out in woodlots throughout the State, and that seldom are. The costs, returns, and methods are accurately known and recorded, and the results are plainly to be seen. Thus a definite step has been taken toward making the forest a demonstration area of immediate practical value.

In addition to the cuttings just described, considerable work has been done in road maintenance and fire protection. The interior roads have been improved by the blasting of ledges, by grading and filling with gravel, and by the building of culverts and six substantial bridges at brook crossings. A 50-foot strip each side of the main interior roads has been cleared of inflammable material, and a 6-foot strip has been similarly cleared around the entire bounds of the property, to make it easier to keep fire out.

It will probably take a year more to put the forest in first-class condition. The several miles of interior roads must be cleared and drained; the shattered down timber must be salvaged where possible or lopped in the tops so that it may soon decay; old accumulations of slash must be burned; overdense stands must be thinned, weed-trees removed, and open places planted up; old fire lines must be widened, and new ones constructed, with boxes of fire-fighting tools placed at strategic points; and the whole property must be carefully remapped, estimated, and divided into clearly marked areal units for purposes of administration and record keeping.

With these preliminaries attended to, the main work on the forest will be devoted first to the gradual replacement of inferior species with more desirable ones, and then to the cutting year by year of just so much as can be taken without diminishing the total productivity, each harvest to be so managed that a satisfactory new crop shall succeed the old. This work may be conducted in such a way as to produce not only an annual cut of lumber, but an annual yield of scientific and practical knowledge gained from careful experiments in the introduction of new species and in the application of varying methods of planting, tending, and reproducing the forest crop. And all the while the forest may illustrate the helpful relation of publicly owned forest land to the surrounding community, both by providing a recreation ground and by offering winter work for farm labor in the slack season and stabilizing local wood-using industries with a steady and reliable supply of raw materials. The soundest progress of forestry is thought by competent opinion to lie in the direction of small, widely distributed town, city, and State forests. In this progress Mount Toby is particularly well situated to point the way.

LEGISLATIVE BUDGET, 1922.**For Permanent Improvements.**

Chemistry Laboratory and Equipment, \$350,000. — This is the third time that this structure has been asked for, and it has been under discussion for many years. In 1918 the Commission on the Investigation of Agricultural Education reported: "An adequate chemistry laboratory is equally needed. The present chemistry building is one of the oldest, most dilapidated and most unsuitable buildings on the campus." Chemistry is a subject required of every student because it is fundamental in all agricultural work. For the same reason the research work in chemistry demands more space than does any other single branch of investigation. It is estimated that it will require an appropriation of \$350,000 to build and equip a building that will be at all adequate to meet the situation. However, not more than one-third of this amount will be needed during the present fiscal year.

Improvements at Power Plant, \$80,000. — The appropriation here requested is to provide for an ash storage bin and for two additional boilers and stokers for the power plant. In order to meet the constantly increasing demand upon the steam boilers, to replace present boilers, some of which are eighteen years old, and to maintain a minimum reserve of boiler capacity for use in case of emergency, our engineer considers it necessary to install two 406-horsepower boilers equipped with stokers. The cost of these items is estimated to be \$35,000. A stoker should be installed in connection with a 200-horsepower boiler already used. The necessary cost of setting these boilers, piping, flue work and other necessary repairs and improvements incident to this installation amounts to approximately \$69,000.

Laboratory for Horticultural Manufactures, \$50,000. — The importance of utilizing various by-products of the farm which formerly were wasted, such as fruit and vegetables, was emphasized during the war, and under the direction of Prof. W. W. Chenoweth of this institution farmers came to see whereby this saving could to advantage be made permanent. In order to adequately give instruction in the preservation of fruit and

vegetable products, a new laboratory building is essential. The plans provide for a one-story building of inexpensive construction, which will furnish laboratories for the various phases of this work.

Improvements at Tillson Farm, \$5,000. — For a number of years the institution has been developing important research work in connection with poultry husbandry, and it is apparent that valuable results may be obtained by the continuation and expansion of these projects. It is desirable that this experimental work be done at an isolated place. The college owns a farm of about 70 acres located some distance from the main area, and it is proposed to develop this farm as an experimental poultry plant. It will be necessary to build laying houses, a breeding house, an incubator cellar, a feed room and a barn. Considerable fencing must also be done. The total cost will be slightly in excess of \$11,000, but it is thought that \$5,000 will be adequate for the initial work.

Macadam Road, \$8,000. — There is no first-class macadam road anywhere on the campus. There are two main approaches to the campus which have heavy traffic by sightseers as well as others. The total length of the main drives on the west campus is approximately one mile. All the coal used by the institution is brought in from the railroad stations, chiefly by automobile truck. That portion of the road which is used for this purpose should be macadamized at once. The distance is approximately 1,750 feet and the estimated cost is \$8,000.

Purchase of Brooks Farm, \$20,000. — The erection of certain buildings on the campus during the past twenty years has made a serious encroachment on the field plots used by the Experiment Station. Immediately adjoining the college estate on the north is a farm, the soil of which is a continuation of that now used for Experiment Station purposes. The area comprises 60 acres, and farm buildings. In a recent appraisal by three competent judges \$21,400 was agreed upon as a fair price for this property. This land is now very urgently needed for the purpose indicated, and, looking into the future, it seems absolutely essential that it be available for experimental purposes.

IS THE COLLEGE ABANDONING AGRICULTURE?

The remainder of this report is an effort to answer as briefly as possible the oft-repeated charge that the College has strayed away from its original purpose and has quite neglected instruction in agriculture. This charge can be easily and completely disproved by any one who will make a thorough and impartial investigation of the facts. Indeed, it can be shown conclusively that agricultural instruction is stressed more by far to-day than ever before, and that the College has less the character of a State college or university than at any time in all its history. It is my purpose to bring some convincing data bearing upon these points to your attention.

The fundamental mistake usually made by those who make this charge is the assumption that these colleges were established for the sole purpose of training boys to become practical farmers and nothing else. Another wrong assumption is that such a narrow purpose was controlling in the minds of those who administered the work of the College in the past as compared with those who are now administering it. Both assumptions have no basis in fact.

The facts clearly prove that the idea of a *liberal* education was originally linked closely with the idea of a technical and scientific training; indeed, a liberal education, based on science, was the basic idea. There was never a thought of a training for a single vocation or a single phase of a vocation in the minds of the statesmen who founded the land-grant institutions. Moreover, the facts prove that a practical and technical training has been increasingly stressed as against the earlier emphasis upon a general scientific education, and that there is taught to-day a maximum of practical and technical subjects as against a minimum of scientific and general subjects in the agricultural colleges.

The agricultural colleges, as you know, were established as the result of the Morrill Land Grant Act of 1862. That act provided for "the endowment, support and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are re-

lated to agriculture and the mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.”

It is not necessary to comment on the breadth of this language except to call attention to the fact that it is far, very far, removed from the thought of a college to train boys to become farmers *and nothing else*.

This act was amended through Mr. Morrill's efforts in 1890 to the effect that \$25,000 should be granted to each State “to be applied only to instruction in agriculture, the mechanic arts, the English language and the various branches of mathematical, physical, natural, and economic science, with special reference to their applications in the industries of life and to the facilities for such instruction.”

This amendment narrows the use of the appropriation only to certain subjects, namely, agriculture, English, and applied science. Note that applied science included economic science as far back as thirty years ago.

On these two legislative acts these institutions were based, and the condensed form of them is now printed in the General Laws of the Commonwealth of Massachusetts in these words: “The leading object of the college shall be to teach subjects relating to agriculture and the mechanic arts, so as to promote liberal and practical education. Its curriculum may include other scientific and classical studies and shall include military tactics.”

That is the exact legal language that at this moment in this State defines the purpose of the College; that is, therefore, the definition of purpose that should control all who have a share in guiding its policies and administering its details. Surely no one conversant with the meaning of such language can possibly say these colleges were meant to be merely vocational schools and nothing more. No one in authority anywhere has so interpreted them. Higher institutions, founded upon a high school training, would not be needed to carry out so simple and narrow a purpose as is in the minds of some of our critics.

What was Senator Morrill's interpretation of this language? What did he have in mind when he championed this project

in his earlier and later legislative experience? In discussing the subject before the lower House, Mr. Morrill said:—

It proposed to establish at least one college in every State, upon a sure and perpetual foundation, accessible to all, but especially to the sons of toil, where all the needful sciences for the practical vocations of life shall be taught; where neither the higher graces of the classical studies, nor the military drill of our country now so greatly appreciated, will be entirely ignored, and where agriculture, the foundation of all present and future prosperity, may look for troops of earnest friends, studying its familiar and recondite economics, and at last elevating it to a higher level, where it may fearlessly invoke comparison with the most advanced standard of the world.

In 1872, ten years after the passage of the Land Grant Act, he further said in a debate in the Senate that—

It was a misnomer to call the institutions “agricultural colleges;” they were schools for the benefit of agriculture and the mechanic arts, whose purpose, as he subsequently explained, was to provide a broad education, intended to be sure to reach the agriculturist and to reach all our industrial classes.

And in 1890, twenty-eight years after the passage of the act, he said:—

The most advanced studies were not, it will be remembered, to be excluded from these colleges, and whenever provided with sufficient resources they should be ready to offer all the learning demanded by any portion of the American people, and yet they must not fall short in the branches related to agriculture and the mechanic arts, but must lead in the highest instruction asked for by the industrial classes.

What were the interpretations, or points of view, of the executive heads of M. A. C. concerning the purpose of the College as expressed in the Morrill Land Grant Act? I shall let them speak for themselves.

In the catalogue of 1867, the year of the first entering class, we find President Chadbourne writing thus:—

The object aimed at in the instruction is, first, to make intelligent, thoroughly educated men; and secondly, to make practical agriculturists. This is demanded by the law of Congress donating the lands, which

declares the purpose to be, "to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life." It is difficult to see how an agricultural education alone would meet the requirements of this law if such an education were desirable. But any system that attempts to give practical knowledge without first having given a broad scientific basis will succeed only in making skillful artisans, and will not send forth men fitted to improve themselves, or add materially to the advancement of knowledge.

It is proposed that, for the present, at least, the instruction shall consist of two courses; a special course of lectures, exclusively agricultural, to be given every winter, and also a regular four-year course of study that shall give a truly liberal education, — a basis for the active duties of life, which any citizen of a free republic may be called upon to engage in. The College will thus offer the advantages of a professional school in agriculture, and an educational course differing from that in the other colleges of the State, but no less extensive and thorough in its requirements.

Undoubtedly there is a difference of opinion as to what the College should be. In reference to some of our best institutions that have been established for more than a century, there is a marked difference of opinion among their alumni and officers as to the most desirable organization for them now to meet the demands of the present time. As no one can claim to have experience in conducting such an institution as this, it would seem to be the wisest way for all well-wishers of the College to go on as best they can in the light of experience gained in the general work of education, and be ready to adopt such changes as the practical working of the institution shall show to be necessary.

The fear is expressed by some that, if an attempt is made to give a truly liberal education, the students will turn aside from agriculture to other pursuits. Undoubtedly some of them will. If such an education is given in practical science as ought to be given in such an institution, there will be a demand for its students as teachers and in other professions. And it would be an education entirely unworthy of Massachusetts, and contrary to the plain intent of the act of Congress donating the land, if it were so meager in its requirements that the students should be fitted only for one pursuit in life. No surer way could be devised to defeat the very end for which the College was established, than to conduct it on a plan which proclaimed, in theory and practice, that its students were to be kept in ignorance of certain things lest they should be above their calling. No institution can ever succeed on such a plan, and ought not to. It is difficult to see what a student would enter such an institution for. Such views are repugnant to every generous feeling which an educated man ought to possess, contrary to the principles of our institutions, and are not sustained by the present position of the agriculturists of this State. The adoption of such a system would be simply saying to the farmers of Massachusetts that they are tillers of the soil because they

are too ignorant for other pursuits. An entirely different principle has been acted upon in organizing the College. While the student is to be educated, agriculture, which rests upon a knowledge of all the natural sciences, is to be made a means of education. It ought to be so presented that it shall be an inviting pursuit for an educated man. When all its processes are scientifically understood, it will be difficult to point to any business or profession that offers a field of thought more desirable.

The four-year course of study for the first class entering M. A. C. was as follows for the freshman year:—

First Term.—Algebra; English Language; Human Anatomy; Botany. Lectures on the Preservation of Health and Methods of Study.

Second Term.—Geometry; Drawing; French; General Chemistry and Mineralogy. (Recitations and lectures.)

Third Term.—Geometry; Drawing; French; General Zoölogy; Botanical Analysis.

Members of the Freshman Class will be allowed to attend at least one lecture daily of the special course on Agriculture, in such departments as the Faculty shall determine.

And as follows for the senior year:—

First Term.—Civil Polity; Intellectual Philosophy; Economic Geology and Mining. Lectures; Law relating to Rural Affairs.

Second Term.—Moral Philosophy; Logic; Æsthetics; English Literature. Lectures; Architecture.

Third Term.—Special subjects; Reviews.

Seniors attend any lectures of the course. Military Tactics; Declamations; Discussions and Themes during the whole course.

I omit the sophomore and junior years for lack of space merely.

In 1871 President Clark's report includes the following statement:—

The instruction in the languages is intended to qualify the graduates to write and speak English with correctness and effect, and to translate French and German with facility. The scientific course is extensive and thorough, and as practical as possible. Every student has the opportunity of becoming a good chemist, a skillful surveyor, and a civil engineer. At the same time, every science is taught with constant reference to its applications to agriculture and the wants of the farmer.

In 1874 President Clark further said:—

It is the earnest desire of the trustees and faculty that the College shall especially promote the agricultural interests of the Commonwealth, but it may be well to remind those who demand that every graduate shall be a farmer, that the act of incorporation passed by the Legislature of 1863 does not intimate that the accomplishment of this result is the mission of the institution. The language is as follows: "the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in order to promote the liberal and practical education of the industrial classes in the *several* pursuits and professions of life."

It should therefore be distinctly understood that, while the most effort and the largest expense have been bestowed upon the agricultural department, the authorities of the College do not propose to require its graduates to engage in any particular business for life. The opportunity for acquiring a valuable education is offered to all the young men of the country, and if the farmers desire to have their sons trained in the best manner to pursue intelligently the profession of their fathers, let them patronize the College. If, however, there are others who wish to have their sons enjoy the advantages of scientific and literary culture under circumstances calculated to interest them in practical affairs, and to prepare them for a life of industry and usefulness, they have equal rights with the farmers, and shall have equally cordial welcome.

In 1883 President Chadbourne again writes:—

The course of study has been so far modified as to introduce more instruction in the structure of the English language, rhetoric and history. The study of French and German heretofore required has been made optional, and the time of recitations so arranged that each student can study both languages if he so elects.

The work of the College has been most efficiently done. The improvement of the students in their studies and in that good order and gentlemanly deportment so desirable in college, has been highly satisfactory.

It is plainly evident that the people of the State, as a whole, have not understood the provisions here made for the education of the young men of Massachusetts. When committees from the Legislature and others have visited the institution and become acquainted with its organization, its means of instruction, and its actual work, the College has proved its own best advocate. To make the College and its work better known to all the people of the State, we ask a careful consideration of the course of study and of the reports of various departments. We also feel justified in once more calling the attention of the Legislature and the people of the State to the founding and organization of this institution as well as to its present condition.

The grant of land and land-scrip for founding agricultural colleges was made by the general government in 1862. The Civil War had brought out with great clearness the elements of national strength,—varied production in agriculture and the mechanic arts, and a citizen soldiery well trained in the art of war. To secure all these in their greatest perfection was the aim of the bill for establishing “industrial colleges” in the various loyal States. Whatever mistakes may have been made in the organization and management of these institutions, no fault can be charged home to the original bill. It was evidently a wise measure, and suggested an outline of organization and management that has not as yet been improved upon. Its significant words are as follows: “The endowment, support and maintenance of at least one college where the *leading object* shall be, without excluding scientific and classical studies, and including military tactics, to teach such branches of learning as are *related* to agriculture and the mechanical arts, in such manner as the Legislatures of the States may respectively prescribe, in order to promote the *liberal* and *practical* education of the industrial classes in the several pursuits and professions of life.” No branch of learning peculiar to the old colleges was to be necessarily excluded; but the new colleges were to push on to the practical application of the sciences they taught, and they were to train all their students as defenders of their country against domestic rebellion or foreign invasion. In a word, they were to educate their students as *men* and as *American citizens*. The rank of the education given is *liberal*, the term applied to the education given by the highest institutions then known. It was to be so broad as to fit men for the “several pursuits and professions of life.” The object of these colleges was to obliterate the supposed superiority of the so-called “learned professions” by securing a “liberal,” that is, the highest, education for those who chose industrial pursuits, thus lifting agriculture and the mechanic arts from the plane of mere routine labor to the dignity of learned professions, founded upon scientific knowledge and allied to, or connected with, those branches of learning essential for a broad and generous culture of the whole man. Many who have attempted the management of these colleges, as well as many who have criticised them, have apparently overlooked the broad and generous plan upon which they were founded. It is doubtful if they will ever accomplish the great work for which they were intended, until their original purpose is so fully and constantly recognized and carried out by judicious, painstaking work that the currents of education shall be once fairly turned toward these new channels. When once fairly turned, that they will continue to flow can no more be doubted than we can doubt the success of any natural process when not artificially obstructed. An education that “gives boys what they need to daily use when they become men” commends itself as rational and practical. All true education should aim at this. And this certainly is the idea that is embodied in the bill founding the industrial colleges of the several States. The provisions of this

bill were accepted by Massachusetts. One-third of the funds received from the United States was given to the Institute of Technology in Boston for the promotion of the mechanic arts, and two-thirds were devoted to founding a college at Amherst for the special work of agriculture. By the gift to the Institute of Technology, the Agricultural College has been freed from much labor in building up a mechanical department, — a fact that has been lost sight of by some, — and is left free to carry out the idea of a college making agriculture the leading idea, while it secures rigid training in military tactics and provides such a range of studies in science, literature, and philosophy, as shall, in the words of the bill, promote “liberal education.”

The course of study aims to do what the original bill declared should be done, — give a practical knowledge of agriculture and horticulture, and at the same time so educate the *man* that the students from the Agricultural College shall not be mere artisans, having learned a trade or business and nothing more, but be liberally educated, so that, as farmers, they shall rank in intellectual training with those who choose what have heretofore been called the “learned professions.” It is plain that farming will never take its true place, nor farmers have the influence, in the government of our land which they ought to have until they take their place with those in other professions, not only as men of power and practical ability, but as men of learning and culture. Those who claim that the farmer’s life forbids this result have never yet fully appreciated the farm as a place for study and thought, as well as a place for labor.

The course of study in 1884 was divided into two parts which were as follows: —

Course of Study and Training, January, 1884.

FRESHMAN YEAR.

<i>Scientific and Literary.</i>	<i>Scientific and Agricultural.</i>
First term:	First term:
Algebra.	Algebra.
Botany.	Botany.
French.	AGRICULTURE.
Second term:	Second term:
Geometry.	Geometry.
History.	History.
Botany.	Botany.
Lessons in Language.	Lessons in Language.
Freehand Drawing.	Freehand Drawing.
French.	AGRICULTURE.
Third term:	Third term:
Botany.	Geometry.
Geometry.	Botany.
French.	AGRICULTURE.

SOPHOMORE YEAR.

Scientific and Literary.

First term:
 Geometry and Trigonometry.
 Botany.
 Chemistry.
 German.

Second term:
 Trigonometry.
 Chemistry.
 Physiology.
 Mechanical Drawing.
 German.

Third term:
 Surveying.
 Botany.
 Zoölogy.
 German.

Scientific and Agricultural.

First term:
 Geometry and Trigonometry.
 Botany.
 Chemistry.
 AGRICULTURE.

Second term:
 Trigonometry.
 Chemistry.
 Physiology.
 Mechanical Drawing.
 AGRICULTURE.

Third term:
 Surveying.
 Botany.
 Zoölogy.
 AGRICULTURE.
 HORTICULTURE.
 MARKET GARDENING.

JUNIOR YEAR.

First term:
 Mechanics.
 English Literature.
 Constitutional History.

Second term:
 Physics.
 English Literature.
 Chemistry.
 Latin.

Third term:
 Physics.
 Chemistry.
 Latin.

First term:
 Mechanics.
 English Literature.
 AGRICULTURE; ENTOMOLOGY.

Second term:
 Physics.
 English Literature.
 Chemistry.
 AGRICULTURAL DEBATE.
 ARBORICULTURE.
 CARE OF NURSERIES.

Third term:
 Physics.
 Chemistry.
 Roads and Railroads.

SENIOR YEAR.

First term:
 Bookkeeping.
 Chemistry.
 Mental Science.
 Mineralogy.

Second term:
 Organic Chemistry.
 Political Economy.
 Microscopy.

Third term:
 Moral Science.
 Geology.
 History of Philosophy.

First term:
 Bookkeeping.
 Chemistry.
 Mental Science.
 Mineralogy.

Second term:
 Organic Chemistry.
 Political Economy.
 AGRICULTURE.

Third term:
 Moral Science.
 Geology.
 AGRICULTURE.

Fourteen years later (in 1898) President Goodell who had been connected with the College from the beginning writes:—

The academic course of four years is divided between nine departments, with the following allotment of hours to the different studies:—

English and literature	533
Other languages	507
Mathematics and drawing	784
Chemistry and physics	833
Botany	519
Entomology, zoölogy, and physiology	559
Economic law and history	381
Military science and practice	496
Agriculture in general	479
Horticulture	377
Veterinary	185
Geology and astronomy	370
Total	6,104

This statement reveals, then, only 787 hours out of 6,104 offered in so-called purely practical agricultural lines, while English offered 533, other languages 507, and economic law and history 381, or a total of 1,421 in strictly humane studies. Add the mathematics and drawing, 784, to this total and you have 2,205, or one-third of the whole. The remainder, you will note (with the exception of military drill) is pure and applied science.

The foregoing excerpts and data clearly reveal the drift of the discussion and its results during the first thirty years of the life of the College. They are typical, not exceptional; they tell the whole story. There was clearly conceived no narrow or limited vocational aim. These men considered it their business to educate as well as to train; to attend to the man as well as to the job. The catalogues for years openly announced that "the College offers a free education to any American student of good character who may fulfill the requirements for admission."

In 1905-06, at the close of President Goodell's administration, the curriculum shows no marked change in content over that of 1898. We find that of the 160 semester credits required for graduation, every student was forced to take 16 credits in English, 9 credits in French, 7 credits in German and 8 credits in

history, economics, and government, or a total of 39. At the same time, he was compelled to take only 14 in what the critic would term practical agricultural subjects. In other words, every student had to spend one-quarter of his time in cultural subjects (one-tenth in English, one-tenth in German and French, and one-twentieth in history, etc.), and only one-eleventh in all practical agricultural subjects. These figures express the minimum required of every student. On the other hand, the most that he could possibly take by election in purely cultural subjects was 51 credits, and the most he could possibly take in practical subjects was 43. This was the absolute maximum possible offered in 1905-06, the year before President Butterfield took charge. In that year, let it be noted, Latin was offered as a four-hour credit for the senior year, — yes, Latin.

I would gladly invite any one to make a careful comparison of the curriculum of 1905-06 with the curriculum of the present day. He will now find no Latin (to his surprise, probably), only one-half as much English, less than one-half as much foreign language, only one professor teaching economics and government, and only one-tenth of a student's total time required in "other-than-agricultural" studies. He would find no justification whatever, therefore, for saying that the College had "expanded away from" agriculture, or towards a so-called State university, during the past fifteen years.

In 1911 President Butterfield defined the purpose of the College in the following terms: —

The chief purpose of the College is to prepare men and women for the agricultural vocations. In this statement the term "agricultural" is used in the broadest sense. Courses are offered which give efficiency in various practical pursuits, such as general farming, landscape gardening, forestry and arboriculture. Students also qualify for positions in institutions designed for investigation in the many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, and for business occupations having connection with the farm and needing expert service.

Contrast this statement with any definition of purpose to be found in any previous report and let him who can say that it is relatively broad. The fact is that it is comparatively

narrow, and marks a decided change only in stressing the practical and vocational aims of the College.

In 1917 Governor Samuel W. McCall appointed a commission to investigate the College. This commission consisted of Ex-President Clark L. Seelye of Smith College, Northampton, Commissioner of Education Payson Smith, Supervisor of Administration Charles E. Burbank, Mr. William Whiting of Holyoke, a business man vitally interested in farming, and Mr. Warren Jewett of Worcester, an eminently practical and successful farmer. This commission made a full and unanimous report which was highly creditable to the College. In regard to the curriculum this report said:—

The land-grant colleges were primarily established to promote the study of agriculture by the most advanced and scientific methods of instruction. In their courses of study one naturally expects that science will occupy the most prominent place, and that it should be taught by men well qualified for their work. The Massachusetts Agricultural College meets this expectation.

There are at present 228 courses in agriculture and the cognate sciences, and only 96 courses in mathematics and the so-called humanities. In the first year 48 courses are given in agriculture and mathematics, and only 18 in the humanities. In the second year 6 courses are required in the humanities, and 54 in agriculture and cognate sciences. After the second year a major course can be elected in one of 17 departments; during the last year 75 per cent of the students elected major courses in agriculture and horticulture. There is no major course in the humanities, and only one-quarter of the student's time is required¹ in these studies. Three quarters of the students are giving three-fourths of their time to distinctively agricultural subjects. Ten times as many courses are given in junior and senior years in agriculture as were given ten years ago, and more agricultural studies have been introduced in the first and second years than ever before.²

There has been no corresponding increase in humanistic studies. Of the faculty 54 teachers are engaged in instruction in agriculture and the cognate sciences, and 14 teachers in the humanities and mathematics. Members of the faculty and representative students alike testify that there is a prevailing tendency among the undergraduates to elect studies according to their supposed commercial values, and to neglect those studies which aim to strengthen and cultivate the mind. While there is a fair showing of humanistic electives in the curriculum, most of them are

¹ This is an error; only one-tenth is actually required.

² This paragraph is evidently based on term courses offered, and does not differentiate between separate and continuing courses.

not required as they are in the Massachusetts Institute of Technology and in other colleges, and only a few of the students elect them.

While the State in its acceptance of the provisions of the Morrill Act is bound to give special instruction in agriculture, it is not less bound by the language of the act to give a liberal education as an integral part of its distinctive work, and not to neglect or relegate to subordinate places those studies which experience has shown are best fitted to nourish and strengthen the faculties of the mind and which will enable men to do better work, whatever that work may be.

In closing, I cannot refrain from quoting the following paragraph from the report of the committee on agriculture of the State Grange presented in Springfield at the annual meeting last month:—

We earnestly desire to see our Agricultural College maintain its position as one of the leading agricultural colleges in America. We believe that the courses of instruction should be as thorough, as broad and as liberal as those of any other college on the ground that the farmer desires as good an education as any other citizen. We especially protest against the tendency in certain quarters to restrict the teaching of such subjects as science, history, economics, etc.,—subjects which are of vital importance to the agricultural industry and to life on the farm.

I cannot refrain, either, from expressing a personal opinion to the effect that in order to deal fairly with the boys of Massachusetts who will hereafter attend the College we must give them not less but more of those subjects that prepare for life and citizenship. The meager amount we now require is nothing short of tragic. No one will contend that one-tenth of a boy's time during the four precious years of college is sufficient for his education as a citizen and as a man. Yet that is all that a large number of our students receive to-day.. Will any one say we are not sacrificing the man on the job for the job;—"the man on the farm," as Emerson said, "for the farmer"? Does not the practical result of our present curriculum "carry us away" from the real educational intent of the Morrill Land Grant Act? I believe it does, and I believe further, that, without losing one iota of the excellent "practical" content which is now included in the curriculum, it is our immediate and imperative duty to march swiftly forward and give a sound educa-

tion as well as a good vocational training to every one of our students.

In this brief discussion I think I have shown conclusively that there is no truth whatever in the assertion that the College has abandoned agriculture and magnified "other things." The truth is there is more agriculture taught to-day than ever before, and less, at least 50 per cent less, of "other things" required than ever before.

EDWARD MORGAN LEWIS,

Acting President.

REPORTS OF OTHER ADMINISTRATIVE OFFICERS.

Report of the Dean.

The duties of the dean's office this year have been divided between myself and Assistant Dean Machmer.

Professor Machmer has had charge of the scholarship of the freshman class, of the dean's Saturday reports, of the meetings of freshman and sophomore class teachers, and of a good part of the difficult and time-consuming matter of absences and excuses. This work he carried on admirably, together with the innumerable personal conferences necessary to keep the boys up to their work by encouragement and sympathy.

My work was concerned with the other classes, with disciplinary matters, and with the reviewing of the bothersome and delinquent cases. A large amount of time also was spent in consideration of the course of study and of such matters as the admission of superior graduates of county agricultural schools and of agricultural departments of high schools. Since Christmas, 1920, I have kept office hours at the rooms of the Department of Education, State House, Boston, every Thursday. In the mornings I have frequently addressed high school assemblies in regard to the opportunities in agriculture and the work of the College. Sixteen high schools were visited in this way. The office hours were usually quite busy with callers of all descriptions. I was able to give first-hand information to a large number who would have had either to travel to Amherst or to correspond back and forth at some length with us at Amherst.

I believe this experiment justifies the practice. Indeed, it is quite necessary in order to have the College tie up effectively with the Department of Education. There are questions of adjustment and policy arising constantly which make a personal interview most desirable. I believe that as the Boston arrangement is more generally known it will save a great deal

of correspondence and make it possible for us to explain matters to an increasing number of people in a much more satisfactory way than by letter.

During the past year we lost the faithful services of Mrs. Mary I. Shores who had been our chief clerk for seven years. Her loss was a great one to the work of our office, for she took care of the innumerable details with great fidelity and had learned to handle the students in a friendly and sympathetic way. Many letters of sympathy came to us from former students in regard to their appreciation of Mrs. Shores. She was ever faithful, ever cheerful, and radiated good-will and a spirit of service wherever she happened to be. It will be difficult to find any one to take her place.

During the past year, also, the dean's office tried to carry some of the work of the registrar's office during the absence of Professor Hasbrouck. Much of this burden was carried gladly and efficiently by Professor Machmer. It necessarily added a real burden to one who was already carrying a good share of the work of the dean's office.

I feel that the important work of absences and of the scholarship of the two lower classes is now in good hands. With the help of student advisers of his choice Professor Machmer will keep the work of the average student well supervised. I hardly know how this important administrative problem can be better met unless we are ready to spend more money in salaries for special supervisors. The work of next year should be still stronger in this respect, and more of the boys saved from the results of carelessness and discouragement.

In regard to this work I beg leave to incorporate in my report a few paragraphs from the assistant dean's report to me.

This year I had associated with me in this work (that of freshmen advisers) Professors Parker and Rand. Both these men did very creditable service in spite of the fact that they were at the same time carrying heavy teaching schedules.

The work requires tact, patience, and sympathy, and cannot be reduced to a simple formula or set of rules. Students must be dealt with individually, for the most part. The adviser must be sought after because he is trustworthy, resourceful, and helpful. His work ought to grow more effective and valuable with each class he fathers. I believe this advisory work very much worth while, and hope the time is near at

hand when the personnel of the freshman advisers will be less subject to change.

The scholarship situation is still unsatisfactory. While the number of failures has not been large, the desire for real study is not gaining as we might wish. I see some relief along three or four general lines: (1) Limitation of the number of laboratory credits which can be counted towards a degree. At present some students in the upper classes are carrying a schedule made up very largely of laboratory courses. They have very little work to do outside of scheduled hours and their influence does not make for good study habits of freshmen, who are bound to get the wrong ideas of college requirements. (2) There is an opportunity to improve the scholastic tenor through a closer co-operation of freshmen instructors. With the heavy schedule freshmen are required to carry, each department should know pretty definitely the requirements and standards of the other departments. Only in this way can assignments and responsibilities be properly and justly gauged. This fault can be corrected through more frequent teachers' meetings during the fall term. (3) There must be fewer outside demands early in the students' career in college. Horseplay, rushing, and meetings of a doubtful value must be eliminated. (4) Classes should begin the first day, if at all possible, which means that textbooks are ordered so that students may secure them before the time scheduled for the first recitation period in any particular subject. To insure prompt starting of class exercises, textbooks to be used and first assignments might be posted on recitation room doors, or even in the recitation room itself.

It seems to me that it might be well for us to make a little closer study of the methods employed by freshman instructors. I am convinced that any freshman instructor should be first of all a strong teacher with sufficient training, of course, to command the proper respect of the students.

EDWARD M. LEWIS,
Dean.

Report of the Director of the Experiment Station.

A brief summarization of the work of the year just closed shows the following as its most salient points:—

1. A continuation of the fine spirit of co-operation mentioned in my last annual report. This has been evident not only between men of the station staff and of the Extension Service, but likewise between the station and the resident teaching staff. In both cases assistance and advice have been given without stint, on request. Such a spirit is needed in order to insure the fullest effectiveness of institutional service.

2. Continued development and organization on the basis of the project system. In addition to this, strict analyses have been made of many existing lines of work, in an attempt to place the station on the most productive and economical plane possible.

3. The institution of weekly Experiment Station seminars, designed to bring to bear on station work the full knowledge and experience of the institution as a whole. The attendance at these seminars and the interest exhibited have been encouraging.

4. A rather marked application of results of investigational work to problems of the field, orchard, and farm. This was particularly noteworthy in the case of the following individual projects: —

(a) *Pomology Project No. 2, "Study of Tree Characters of Fruit Varieties."* — This project was started eight years ago under the Adams fund by Dr. Shaw. Work has progressed to such an extent that a method has been developed whereby purity of nursery stock when examined in the period of full leaf growth may be determined with a very fair degree of accuracy. This fact has led to the organization of a nursery certification plan, operated through the agency of the Massachusetts Fruit Growers' Association. Up to date its application is confined to nurseries lying within the bounds of the State of Massachusetts. If it continues to be as successful as the first year's experience indicates, there is no doubt that the scope of the work will be enlarged.

(b) *Botany Project No. 14, "Control of Tobacco Wildfire."* — This work became necessary through the indications of widely distributed infection seen in the seed beds of last spring. Results have been very encouraging, have been incorporated in a published bulletin, and promise to give to our tobacco growers a satisfactory means of control.

(c) *Botany Project No. 10, "Apple Disease Control Investigations."* — Through the co-operation of fruit growers in the eastern apple section, it was possible for the station to undertake work on apple scab. The experimental plots in bearing orchards were supplied by the co-operating fruit growers, with a probable ultimate loss to themselves as individuals. Trans-

portation costs and labor costs, other than of our staff members, were likewise met by the fruit growers. The companies interested in the sale of machinery and likewise of spray materials were of great assistance in securing the necessary equipment and supplies. The work of the first season, although necessarily incomplete, indicates that control of this destructive fungus is easily possible.

(d) *Plant and Animal Chemistry Project No. 5, "Chemistry of Arsenical Insecticides."* — Information on this subject has been collected over a series of years, with lately an enlargement in the field of fungicides. At the earnest request of fruit growers, Messrs. Holland, Bourne, and Anderson were assigned to the task of bringing together the scattered material in the form of a bulletin, which was published under the title "Insecticides and Fungicides for Farm and Orchard Crops in Massachusetts." Fruit growers all over the country have recognized this bulletin as a real addition to their working knowledge of these materials.

(e) *Plant and Animal Chemistry Project No. 11, "Determining the Chemical Composition, Digestibility, and Feeding Value of Kiln Dried Apple Pomace."* — Final report on this work is now in press. It is economically important in that it points the way toward a probably economical method of utilization of a home-produced source of animal food, ordinarily largely wasted.

(f) *Plant and Animal Chemistry Project, "An Investigation of the Solubility Effect of Ammonium Sulfate on the Soil of Field A."* — This work as carried on under the leadership of Professor Morse is of national significance owing to the fact that sulfate of ammonia is now the most important single source of fertilizer nitrogen.

In addition, mention should be made of the organization by the Extension Service, but under the leadership of Dr. Franklin in charge of the Cranberry Station, of a series of schools for cranberry bog foremen. The plant of the Cranberry Station has been placed at the disposal of the Extension Service for this work. From the institutional standpoint this dual utilization of research equipment is significant.

5. Continued handicap to the fullest service of the station brought about by the lack of publication funds. In this con-

nection, however, I desire to go on record as appreciating to the full the excellent service accorded the Experiment Station by the State printers.

6. Increasing difficulty due to shortage of land, with consequent danger of too great dependence upon laboratory data unchecked by field experience.

APPRENTICESHIP IN AGRICULTURAL RESEARCH.

Among the changes of the year which give rise to thought is the withdrawal from the institution of two men, occupying almost key positions, for the purpose of continuing their research work in the service of commercial agricultural industries. These men were Dr. G. H. Chapman, who resigned to undertake service with the Connecticut Valley Tobacco Improvement Association, and Mr. C. L. Beals, who left research work in animal nutrition as carried on here at the Experiment Station to take up research work in dairy manufactures for the Sheffield Farms Company. In both cases the opportunity for service was apparently increased, and likewise the financial rewards accorded the work.

The withdrawal of these two men has caused serious interruption of the work on which they were engaged. Yet the fact that commercial agricultural industries are coming to realize the value of research is encouraging. The further fact that they are capitalizing for the benefit of the industry which they represent the knowledge and experience gained by apprenticeship in research is a real cause for gratification. So numerous and important are the problems awaiting solution in the field of production, as well as in all other fields of agricultural endeavor, even including the problem of utilization of food in the home, that it has long been apparent that certain parts of the work must be left to organized industry. Therefore, while regretting the withdrawal of these two men, I must take this occasion to point out to you a too seldom appreciated or realized function of the Experiment Station, — to give apprenticeship in research in order that both the industries purveying to agriculture and those depending on agriculture may secure the type of research service which is needed. It is the function of the College and the Graduate School to train men; but it

is the function of the Experiment Station to give to these men the experience without which they cannot hope to fill important positions in industries relating to agriculture.

NEEDS OF THE EXPERIMENT STATION.

The two great needs of the Experiment Station at the present time may be listed as more land and greater man power. Regarding the first, I need only refer you to my last annual report, stating the present conditions under which the Experiment Station is working, and the causes which have brought these about. This part of the subject I must dismiss with a single statement that not until the land needs of the Experiment Station are met will the station be of fullest service to the people of the Commonwealth.

Regarding the need for additional man power, first attention should be given to those existing departments, already organized and equipped, in which production is curtailed through lack of sufficient assistance. Clear separation should be made between such requests and requests which contemplate entirely new departmental organizations. The positions needed for the former purpose are as follows:—

1. *Research Professor of Agronomy.*—For a number of years this position has been combined with that of the Director of the Experiment Station. It seems impossible, however, to give to the administrative work of the station the time and thought which it needs, and at the same time keep abreast of the times in the study of fundamental problems of crop production. The increase in the overhead cost of maintenance, owing to the employment of such an officer, will not be large. The value of work of this kind to productive agriculture is apparent to all.

2. *Laboratory Assistant in Pomology.*—In productive orcharding Massachusetts has recently made great strides. At no distant date it is expected that the State will be self-supporting in apple production, and may, in fact, have a surplus for export. The Department of Pomology is now so organized as to admit of very thoroughgoing work in this particular field. The new assistant is needed in order to make fully productive the knowledge and experience of men now in the department.

3. *Assistant Research Professor of Vegetable Gardening at the Market-Garden Field Station.* — The work at the Field Station is now well under way, but the recording and study of accumulating data have been found time-consuming in the extreme. For experimental work on the many problems which must be faced in commercial vegetable growing, this additional research worker is needed. His appointment will not increase materially the maintenance charges at the Field Station.

4. *Investigator in Plant Pathology*, to be located at the Market-Garden Field Station, and

5. *Investigator in Economic Entomology*, to be located at the same place. Owing partly to differences in climate brought about by proximity to the seacoast, problems in the control of the enemies of vegetation as met in the eastern part of the State differ from those faced at the home station.

In addition to the foregoing I must point out that an Extension worker in the Department of Veterinary Science is sorely needed. His duties would be to organize on an Extension basis certain work now being done by the Experiment Station in avian pathology. Until such time as this Extension worker can be secured, the research men of this department cannot concentrate on the work for which they are primarily engaged.

It should also be noted that the fine equipment of the Department of Microbiology of the Experiment Station is not now fully utilized owing to lack of man power. The subjects being studied by this department are basic and fundamental. At least one additional assistant research professor is needed in order that the department may continue studies initiated during the war on conservation and preservation of food products.

Owing to the present depressed business conditions, I will make no mention in this place of other departments standing in need of research service.

THE CLERICAL STAFF.

The work of the station is handicapped to a great degree through lack of sufficient clerical service, and likewise through the lack of labor-saving computing machinery. This is particularly the case in the Department of Agricultural Economics, in which naturally a large number of statistical studies must

be made. The output of this department may be greatly increased by the investment of funds in the machinery mentioned, and the employment of competent clerical assistance. Similar to a degree is the situation in the Department of Poultry Husbandry, in which experimental data are accumulating more rapidly than they can be studied in an interpretative way. To allow such a state of affairs to continue is an invitation to failure. The only present remedy is to require our research men to spend their time in clerical work rather than that for which they are better trained and more productively employed.

REGULATIVE WORK.

Through State law, four different regulatory services are vested in the Experiment Station as executive agency. These are the fertilizer control, the feed control, the inspection of dairy glassware and examination of milk testers, and the poultry disease elimination law. The sum total of the appropriations is \$25,050.

There have been no changes from previous practice in the feed control as carried on in the past year. Funds are insufficient for carrying out all the provisions of the feed control law, but aside from this, work is progressing in its usual efficient way. Work under the fertilizer control law has likewise progressed in the usual way, the only change worthy of note being further study of method of presentation of results, and a definite policy looking towards division of the subject-matter, with more frequent reports than previously, but each one of a limited scope.

With the increased appropriation given at the legislative session of 1920-21 for the support of the poultry disease elimination law has come the opportunity for increased activity and better organization. With the employment of three permanent assistants in place of two temporary assistants, the work is now on a sounder and more thoroughgoing basis than has heretofore been possible. Likewise it is now so organized as to attempt to clean up certain sections of the State, in the hope that after a reasonable number of years distribution of the disease will be so reduced as to make further work unnecessary.

SIDNEY B. HASKELL,
Director of the Experiment Station.

Report of the Director of the Extension Service.

The report of the Extension Service for the past year will be confined to discussion of but a few outstanding factors in the work, leaving statistical data and detailed comment for the full report which will be submitted to the Governor, in accordance with congressional requirement as set forth in the Smith-Lever Act.

CAREFUL PLANNING HAS RESULTED IN MORE GENERAL ACCEPTANCE OF IMPROVED METHODS.

The Extension Work of the past year has been characterized by more carefully defined projects and plans of work, more intensive efforts in fewer fields, more work with groups and less with individuals, more careful appraisal of values resulting from time and money spent, and, most important of all, more farmers and home-makers teaching in their localities by means of co-operative demonstrations. Our work is based on the conviction that farmers and home-makers, with adequate support of county agents and specialists, are the best Extension teachers, and are, in the main, best qualified to determine the subjects in which teaching is most needed. The task of the Extension Service therefore becomes increasingly one of finding the most successful men in the business of farming, and women in the business of home-making, assisting them to perfect their practices, training them in methods of informal teaching, and organizing the attention of the community to them and their demonstrations. It is also noted that such teaching is effective proportionately as communities have themselves determined, in consultation with the county staffs, what demonstrations were needed, and from such discussions have decided to support a program of their own making. It is hardly too much to predict that next year will see almost the entire Extension program built on the analysis of community needs by the men and women most affected, guided always by the counsel of the county and College Extension workers, and involving the teaching efforts of hundreds of men, women, boys, and girls.

These elements indicate the magnitude and importance of Extension work. It is not a program predetermined by paid

agents and superimposed on the State; it is an intelligent and democratic effort of the average citizens in our communities to effect changes toward better farm and home practice, with resultant prosperity, opportunity, and happiness. The effort is to get general adoption of the methods which have proved most successful, and which are already being followed by the more progressive. It is evident that no paid staff could be large enough or uniformly acceptable enough to accomplish this by the direct teaching of all farmers. The time and abilities of the College and county staffs must be given to training demonstrators and creating nuclei of sound practice in all parts of the State. The quickness of ultimate acceptance of their practices will come in direct proportion to the number and effectiveness of the co-operating demonstrators. Probably it is safe to say that no funds expended by the State give such far-reaching dividends in education as those used in support of this co-operative Extension system.

STAFF CHANGES FEWER THAN LAST YEAR.

The last annual report of the Director of the Extension Service closed with the following:—

Looking forward to the new year our principal need is for men and women of experience and capacity who can take up the work interrupted by resignations, and who can be sufficiently supported to enable their continuance with us for more than a brief time.

It is pleasing to report that this need has in part been met. Only five resignations, involving three positions, are to be reported in the professional staff, and the clerical staff has been quite constant. No changes have occurred in the staff of the county agricultural agents; only two in the staff of county club agents; and nine in the staff of home demonstration agents.

It is in the latter field, with three State leaders in service during the year, and with nine resignations of home demonstration agents, that serious disturbance to work has occurred. To offset this a most encouraging factor is noted in the determination of the women in the counties that work shall continue, and in a greater effort on their part in undertaking the necessary tasks of volunteer and unpaid teaching.

It is also worthy of note that relations with other State and county agencies are cordial and co-operative. Every effort is being made to define programs of work and discuss possible overlapping of efforts with these other agencies. It is increasingly evident that Smith-Hughes, or vocational work, and Smith-Lever, or Extension work, occupy separate fields, with only a slight marginal overlapping; also that in function there should be the closest co-operation and frequent interchanges of service between these two staffs.

RESULTS OF REDUCED APPROPRIATIONS.

The State appropriation for Extension work for 1921 was 12.8 per cent less than that for the year 1920. Not only were our State funds reduced, but our Federal funds were decreased automatically by the new census. As a result, we have been obliged to continue to leave five former positions unfilled, employ none of the workers urgently needed in some of the newer fields, keep all our traveling staff at home from four to six weeks, retard the development of our correspondence courses, withdraw from the field of exhibits at the fall fairs, reduce the scope of our Summer Farmers' Week, and curtail work in many minor details. As a result of this economy we have finished the year with a balance of \$2.97.

At present our ability to render effective service to the people of the State is seriously crippled. For the preparation of Extension material and the rendering of specialist service in the fields of rural engineering, animal and poultry diseases, plant diseases, insect pests, floriculture, forestry, and household management we have to depend on resident teaching and the Experiment Station staffs, already overloaded, or decline the opportunity altogether. Persistent demands in these fields indicate the need of Extension specialists. It is not our belief that multiplication of specialists in a single field is either desirable or justifiable; one good specialist in each field should suffice to prepare the material, train and support our county agents and co-operating demonstrations, and lead the Extension work in his or her field. It is futile, however, to discuss any enlargement of staff unless adequate maintenance funds are given to allow such staff members as we have to work effectively.

NEED FOR PERMISSION TO USE REVENUES AS CIRCULATING FUNDS.

A part of this difficulty would be overcome if the Extension Service were allowed the use of its revenues as circulating funds. A much wider use of our published material would be possible and the increased service could be made self-supporting. Illustrative material to support demonstrations could be made and used in much larger quantities, without increased cost to the State; the educational camps during the summer could be greatly increased and put on a self-supporting basis; the landscape work with small towns and communities could be doubled in volume; a self-supporting film library of agricultural material could be built up; exhibits could be again prepared and furnished at cost to the organizations desiring them; and in such special fields as poultry disease identification and prophylaxis the staff could be increased or decreased according to need, with reduced cost to the State. The Commonwealth is now limiting the fullest productivity of its funds when materials worth using can be produced in limited quantities only, and cannot be further produced for sale to those who would pay for them. It seems most unfortunate that the College is unable because of these legislative restrictions, to give the people of the State an educational service for which they are willing to pay.

PRINCIPAL NEEDS.

The principal needs of the Extension Service are adequate maintenance funds to make effective the work of such staff as we have, and legislation to permit the use of revenues in certain activities as revolving funds. I omit emphasis this year on the need of new specialists in fields where calls are pressing, as indicated earlier in this report.

JOHN D. WILLARD,
Director of the Extension Service.

Report of the Director of the Graduate School.

The Graduate School has many problems which vitally influence it. For reasons which need not be mentioned, it is best that they be taken up one at a time. In this report the writer would like to consider the fundamental or basic as it pertains to agriculture and agricultural education of graduate grade.

GENERAL.

It is commonly accepted that professions, vocations, or callings of any nature require different subject-matter, and, to a limited extent, different training for preparation. While subject-matter must vary widely to meet the purposes, training, which is more of a common element running through all subjects, may not vary so much.

In the case of the ministry applied work is found in the theological seminary, while the general basis and cultural courses in college precede the seminary courses. With the law there is a very similar arrangement, — the law studies are given in a law school following a general collegiate course. Medicine is drifting in the same direction, so that the best medical schools at the present time call for collegiate training of four years, and even specify some particular subject requirements. Engineering has not gone quite so far, but in reality is fostering much the same method of education. While there are short-cut possibilities, the results are so much in favor of the general collegiate training followed by specific professional or vocational training that the only objections raised are time and expense. Can agriculture, in many respects a much more gigantic profession than any, do less? It will doubtless for many years to come have to provide education for all grades and all types of individuals, but ought this essential profession and industry neglect its growth and its future possibilities, when already the human family has been made to appreciate its limitations for supplying food?

At this moment let it be understood the writer is not dealing with farm labor, "recipe" or artisan farmers, or with any other set of individuals working in agriculture, who, through choice

or unfortunate conditions, have elected to be automata, routine performers, or mechanical human entities, and who simply learn to do a thing and then work because society so ordains. They too deserve every consideration. Every profession has this type of man, — the ministry, medicine, law, and engineering, as well as many others, but the advancement of the profession and its contribution to society cannot be said to lie with these classes. Doubtless the self-claimed agent as the anointed of God, the community "wiseacre" who dispenses law to his neighbor without an actual knowledge of it, the grandmother panacean physician who does not hesitate to take the responsibility for all community diagnoses and treatments in care of all ailments, and the pseudo-engineer who imposes himself upon every automobilist or farmer as a heaven-born mechanical and electrical genius have their place in maintaining the equilibrium of society and satisfying its whims, as a drag to a ship which should not proceed too fast among dangerous shoals. They are so ignorant that they are not aware of it, and not for a minute do they doubt their wisdom. Society as a unit or taken as a whole cannot be much in advance of this average stage, otherwise such assumptions would not be tolerated.

Agriculture labors under many disadvantages. It can use workers of the lowliest order and every grade to the highest order. Comments, therefore, bearing upon the professional features of agriculture are confused because they are not defined by restricted applications. Agriculture, too, is so big that no mind can encompass the entire expanse; accordingly, specialization has a tendency to make of it a battlefield for factions, each faction — whether farmers, pseudo-farmers, business men, bankers, politicians, statesmen, professional men, teachers, or investigators — thinking its approach the only safe and sane approach, and its solutions for the problems of agriculture the only proved answers. To partisans in agriculture, likewise to factions, and especially to the wiseacres, the panacean individuals, to the self-anointed of God, and to the pseudo-types who are no nearer agriculture than the mountain top is to the plain, permit it to be said that human limitations are only exceeded by ignorance. Agriculture has depths untouched

and expanses unexplored. Agriculture has no truly thought policies (scientific theories) or business policies because of its many reaches and the paucity in its strictly scientific attempts. Agriculture suffers from its magnitude because the men occupied with its advancement cannot stop to discover its depths and have to spread themselves so thinly over its surface that they have no time to observe details. Agriculture is crying for more men who are so highly trained that, no matter in what division of labor they find themselves, they will not only appreciate agriculture and its difficulties, but will contribute results of value in their particular niche.

In surveying and interpreting agriculture comprehensively there are three grand divisions: the manufacturing or productive end, the managing, sales, or commercial aspect, and the social phase. Agriculture therefore becomes technical and scientific, economic and sociological.

With this setting it may be possible to promulgate a consideration of the basic education in agriculture for the preparation of a man who can contribute to agricultural progress or advancement.

THE FUNDAMENTAL OR BASIC DEVELOPMENT IN AGRICULTURAL EDUCATION.

In order to outline and define any position effectively in agricultural education, it seems necessary to mention the old and much-discussed division in education, — cultural and utilitarian. Since our study is mainly one of the utilitarian, it is very desirable that an attempt at least be made to describe what is meant by cultural, in which we may not all agree.

The Cultural in Education. — Culture includes man's capacity for sympathy and appreciation, — sympathy as a reaction which results from similar experiences or feelings; and appreciation as a consequence of actual knowledge of man and his accomplishments, together with the great objective world as a background. From this it follows that a cultured man must be truly in sympathy with *all* of his fellow men and appreciate their interests, their motives, and their actions. Culture, therefore, reaches into the arts, the sciences, literature, history, economics, business, politics — in fact, it assumes an acquaint-

ance with all branches of knowledge, with all activities of men, and with all the finer feelings of their souls.

It appears in men in different degrees as does the utilitarian. Perhaps it may be safely said that these two objects of education should be happily blended. Pertinently may it be added, in a negative sense: An education without idealism, without a motive beyond the acquiring of a sordid dollar, without the translation of effort into terms of something other than bargaining, and without an endeavor to understand those agencies which have been utilized to raise man out of his morbid animal self to realms of pure enjoyment and improvement, cannot be said to be cultural.

THE FUNDAMENTAL AND BASIC IN AGRICULTURAL EDUCATION AS INTERPRETED MAINLY FROM THE UTILITARIAN VIEWPOINT.

The principal function of a Graduate School in an agricultural college is to prepare men to master the problems of agriculture from the side of production, of commerce, and of society *in an agricultural atmosphere*. Men thus prepared must be able to solve the problems satisfactorily and not dawdle over them because of lack of training and understanding. The limitations in training and education should never be recognized as an excuse, although there may be many other extraneous causes for inefficiency. This statement applies to investigations, to teaching, and to expert services in the many lines of agriculture.

In preparing young men for such tasks, no element seems more important than a properly conceived foundation, — a basis which removes as many restrictions to action as possible and which serves as a starting point. That the products resulting from a truly basic training and from an education without basic training differ in their capacity for efficiency in those lines of action for which preparation has been made, if properly judged, there can be not the slightest doubt.

The inherent value of such training is ascribed to the following reasons: —

1. Growth and unimpeded action by the human agent are dependent on it.

2. Agriculture advances by what is found in it, and it takes its position in the world by or on account of these intrinsic values, thus acquiring tone, place, and attraction through real merit.

Formal education in agriculture has to deal with two classes of fundamental subjects: —

1. Such basic subjects as are primary and more or less commonly important to all studies.

2. Such subjects as are restricted and are only specifically basic to limited study ranges and even to single subjects.

From this arrangement it is at once gathered that certain subjects may stand by themselves, isolated or more or less unrelated, while at the other extreme very little can be gained without passing through a long series of preparatory and developmental subjects. Then there are all grades of subject requirements existing between these two extremes. Agriculture is concerned with all grades or types of basic study. To put them in a single cast, or to base conclusions upon any one or several of them, may be, from the very nature of the case, very misleading and unsound.

Any scheme that may be offered will be faulty, but an approach may be attempted. Too many factors, both known and unknown, enter in, and these known factors cannot be presented in this report; in fact, a very extensive and exhaustive treatment is called for here. My purpose, under the circumstances, will be suggestive, approximating the true conditions as nearly as feasible.

Before offering the specific scheme, it will be only just to say emphatically that a man trained for efficiency, and efficiency only, having no other objective in mind, can never breathe the breath of life into agriculture in a soulful manner. There should accompany the efficiency ideal the cultural with its spiritual interpretations. Even then the cultural will fall *far*, *far* short because it is so narrowly bounded.

The basic or fundamental from the utilitarian standpoint cannot be brought out forcefully unless there is an analysis along a single channel to make clear the concept advanced. This will be done by subjects now available in College.

GROUP I. GENERALLY AND ESSENTIALLY FUNDAMENTAL.

English.

Spoken — written (spelling, reading, writing, composition).

The medium of thought-transmission for English-speaking peoples. Accuracy in thought-transmission is dependent upon accuracy in language and standardization.

French and German.

The more proficient the student is in reading, writing, and speaking, the more valuable is the language.

These languages, when acquired, will extend the values of English from 50 to 100 per cent in knowledge and efficiency.

Mathematics.

Arithmetic, algebra, geometry, trigonometry, analytical geometry, calculus.

Mathematics is the mechanism of quantity, direction, space, and time which enters into every measurement, calculation, and estimate. Every problem of life which is considered seriously is interwoven with this mechanism. "Conterminous with space and coeval with time is the kingdom of mathematics; within this range her dominion is supreme; otherwise than according to her order nothing can exist, nothing takes place in contradiction to her laws."

Physics and Chemistry.

Nature of matter, reactions of matter, energy, heat, light, electricity, sound.

The laws of matter and force, the understanding of material nature and the universe, and the direction of concrete existence focus in physics and chemistry.

GROUP II. PERTINENTLY FUNDAMENTAL.

Biology.

Botany, entomology, microbiology, zoölogy; life, growth, food, change, diseases.

The morphology and systematic study of living forms and their physiology. Factors which condition life make for growth, control, and extinction. Health, nourishment, protection, and material happiness find their origin here.

Geology.

The earth, its genesis, its structure, its forces, its changes.

This subject involves the preceding subjects and composes them in the interpretation of our mother earth.

GROUP III. ISSUES AND APPLICATIONS.

Class 1. Applied Sciences. — Mathematics, physics, chemistry, microbiology, botany, entomology, zoölogy, pathology, veterinary science.

Class 2. Technical Vocations. — Agronomy, animal husbandry, dairy husbandry, poultry husbandry, pomology, market gardening, floriculture, horticultural manufactures, landscape gardening, farm management, rural engineering.

These are basically the same: class 1 enters class 2 for the definite purpose of scientific efficiency, and class 2 leads to a very definitely evolved goal. Both classes find their energizing values in Groups I and II.

GROUP IV. THE HUMAN OR SOCIAL COMPLEX.

Literature, history, governments, economics, education, sociology, art, etc.

Cultural and applied, subjective and objective (somewhat) in their approach, essential to intercourse and expressive of society, these subjects become truly issues with some basic values, and should be objectively founded and spiritually exploited. Much force is contributed to this group by social contacts throughout life, and much of the training emanating from them may be and is obtained beyond school or college walls.

SOME SPECIFIC CONSIDERATIONS.

There is a wide difference between a student fundamentally trained and one without such training. Likewise the difference between one trained wholly from the utilitarian standpoint and one possessing the values of cultural training is conspicuous. The latter, however, enters into our considerations only incidentally, and will not be illustrated.

Students in a class without fundamental training when asked certain questions of everyday importance will display answers shooting in every direction as a loose lot of skyrocketers set off without direction or control. On the other hand, students who have had genuine basic training, will, by a process of direct utilization of laws, principles or policies, and facts, confine their reasoning within established limitations. This has wide application not only in the practices of agriculture but within every walk of life. In spite of the contention of very, very practical men that they want only practical things, which are usually unrelated, promulgated in our educational system, they themselves — these very, very practical men — are constantly

employing policies unconsciously which, if they were analyzed, would be found responsible for their success and generally limited activities. They will discuss them with you if they are drawn out in the right way. They themselves are under the spell of what they attempt to condemn. Basic training gives *well-established thought-policies* and *act-policies* for the guidance of students and of men. Failure most frequently results from incapacity to relate thoughts and actions to established laws, principles, or policies.

Ask a class of untrained students why sugar beets with a high content of cane sugar will not grow and produce sugar if covered over with a thick layer of straw, the replies will be impertinent, irrelevant hearsay, unintelligible, haphazard, indiscriminate, and indifferent. Ask the same question of a class of students basically trained, and the answers will proceed cautiously and rationally. In the first place, their answers will be restricted within certain limitations. Within the limitations the factors of growth appear one by one in their minds, and are weighed against the conditions named in the question. When each factor has been carefully and critically reviewed and a result secured, they then put these results together in a reply covering the question. Their minds operate by analysis and synthesis in the light of a knowledge of the facts available. If every factor can be subjected to their operating mental process, and carefully adapted, their answers cannot be far from wrong. Specific and detailed information enters into their consideration in the same manner as in the case of a successful contractor. They have acquired a knowledge of the relation of sunlight, of carbon dioxide, and water to the sugar beet with its sugar formation; the need of oxygen, the influence of moisture and evaporation, not only to the beet plant but to the fertility of the soil; the relation of the roots of the beet plant to the needs of nutrition; the elements essential to nutrition, and the changes that take place in the plant through the agency of chlorophyll and protoplasm. In short, the entire range of plant growth as applied to the sugar beet, with especial reference to its growth and production of sugar, becomes the basis for the answer given; in other terms, a familiar knowledge of botany, physics, chemistry, microbiology, and mathematics

may and does consciously and unconsciously influence the character of the answer, particularly if considered intimately and quantitatively.

The same class of problems, of course, with different subjects, confronts every man, whether he be a banker, a statesman, a politician, a merchant, a manufacturer, a skilled workman, or a common laborer. Not only are his problems the problems of his vocation, profession, or business, but they are the problems of living — of his relation to society, to State, and to the Nation. Is the man to solve his problems with impulse and spontaneity, with haphazardness and indiscrimination, and without basic training leading to solution, or is he to solve them in the light of established facts and rational inquiry? Shall we train students to be simply human tools, or shall we strive to make of men intelligent workers with capacity to spiritualize their efforts? Is it the function of the Agricultural College and the Graduate School to prepare the artisan type of man for agriculture, or strive to train a man to be a *man* who can assist in making agriculture a real profession and a real industry rather than a mere trade without incentive other than pecuniary returns, and who can spiritualize agriculture into attractiveness?

CHARLES E. MARSHALL,
Director of the Graduate School.

Report of the Director of Short Courses.

Under Short Course administration the following schools and courses were offered during 1921: —

(1) The Two-Year Course in Practical Agriculture, (2) the Ten Weeks' Winter School, (3) the Summer School, (4) two Vocational Poultry Courses, one starting in September and the other in January, (5) the School of Rural Home Life, and (6) Unit Courses for disabled veterans, sent to this College by the Veterans' Bureau, for instruction in English, arithmetic, and agricultural and horticultural subjects.

The number enrolled in Short Courses this year was approximately the same as for 1920, as may be seen from the following table: —

	1918.	1919.	1920.	1921.
Two-Year Course	37	238	288	293
Ten Weeks' Winter School	91	63	112	83
Summer School	68	238	322	353
School for Country Clergymen	—	—	—	19
Vocational Poultry Course	5	13	19	26

That the student body is comparatively mature is shown by the tables giving the age of students enrolled in the Two-Year Course in 1920-21.

AGE (YEARS).	1920.		1921.	
	Number.	Per Cent.	Number.	Per Cent.
17	19	6.7	15	5.4
18	33	11.3	25	8.3
19	34	12.0	43	14.3
20	36	13.0	40	13.3
21	26	9.0	24	9.9
22	24	8.0	17	5.8
23	19	7.0	17	5.8
24	14	5.0	14	4.6
25 and over	75	28.0	98	32.6
	280	100.0	293	100.0

It was found necessary to reorganize the Two-Year Course. Under the old plan of one general course, with few electives, many students were taking subjects in which they were not interested. Under the new plan there are seven groups of electives, having for their purpose the preparation of students for specific vocations.

The following are the seven groups now available to the students in the Two-Year Course: animal husbandry, poultry husbandry, dairy manufactures, general horticulture, pomology, floriculture, and vegetable gardening.

The work of reorganization was done by the several departments and divisions in co-operation with the Director of Short

Courses. The reorganized course was then submitted to the President for final action. The reorganization of the course seems to have met the approval of both the faculty and the student body.

No modification has been made in the organization of either the Summer School or the Winter School.

Housing. — We have reached practically our maximum of service to the State in resident instruction in the Short Courses, until some provision is made for the housing of part of the student body on the campus. During the regular year, from September to June, the most practical time for offering Short Courses, students who are here throughout the year have secured practically all the desirable rooms near the College. The result is that the more mature students who come in for the Winter School find it necessary to go a long way from the College to secure rooms. It is not advisable to encourage students to come here for the winter session unless they can be comfortably housed. The solution of this problem lies in the building of a dormitory for the housing of a part of the regular four-year student body, thus making more rooms available for rental.

Future Developments. — In the further development of Short Courses, the need for specialized instruction to groups of men and women actually engaged in some particular farm occupation will have to be recognized. The Division of Horticulture, under the leadership of Prof. Frank A. Waugh, is organizing such a specialized course this year in co-operation with the New England Nurserymen's Association and the Massachusetts Nurserymen's Association. Students who take this special course for nurserymen are required to have already had practical experience before entering. The course is limited to twenty-five students.

Service of the College in the Rehabilitation of Disabled Veterans. — This College was one of the first agricultural institutions to undertake rehabilitation work for disabled veterans of the World War. At this institution the Unit Courses for veterans who had not had a common school education were first organized. These Unit Courses included elementary courses in English, arithmetic, poultry, dairying, soils and crops, rural

engineering, animal husbandry, pomology, general horticulture, vegetable gardening, and floriculture. The plans developed here were utilized in other schools and colleges throughout the country. It was necessary to provide these special courses for the veterans who had not had a common school education, because at the time they were provided there were no prevocational schools to give elementary education in English and arithmetic. During the past three years many prevocational schools have been organized so that disabled men may secure training in English and arithmetic in these schools. I am recommending, therefore, that the Unit Courses in this institution be discontinued after June 30, 1922. During the three years we have carried on the work of rehabilitation, approximately 500 disabled men have been enrolled in the College.

Supervision of Farm Practice and Employment. — The supervision of students in the Two-Year Course, during the six months they are required to take farm experience, is under the able direction of Mr. Paul W. Viets. Mr. Viets has worked out an excellent plan of supervision during the farm practice period. The record he keeps of the students' work is such that he can give definite and reliable information to any employer.

JOHN PHELAN,
Director of Short Courses.

TABLES AND STATISTICS.

TABLE I. — *Resignations.*

POSITION.	Name.
Library assistant	Florence Archibald.
Stenographer, Department of Rural Home Life	May G. Arthur.
Matron, women's dormitory	Mrs. Jessie Bacharach.
Clerk, Department of Microbiology	Mrs. Celena M. Baxter.
Clerk, Extension Service	Mrs. Carolyn E. Butterworth.
Field agent	George M. Campbell.
Research professor of botany	George H. Chapman.
Instructor in mathematics	Francis P. Clark.
Clerk, Department of Microbiology and Graduate School	Elizabeth Coleman.
Supervisor, home demonstration projects	Laura Comstock.
Stenographer, Division of Agriculture	Irene Crutch.
Instructor in entomology	William L. Dowd.
Honorary director of the Graduate School	Charles H. Fernald. ¹
Librarian	Charles R. Green.
Supervisor of Extension schools and exhibits	Robert D. Hawley.
Clerk, Department of Physical Education	E. Franklin Holland.
Stenographer, President's office	Mary E. Horton.
Curator, Department of Botany	Marguerite G. Ickis.
Stenographer, President's office	Ruth Leban.
Stenographer, Division of Agriculture	Aline J. Legare.
Stenographer, treasurer's office	Marion B. Macarty.
Stenographer, Experiment Station	Rebecca L. Mellor.
Investigator in chemistry	Anne C. Messer.
Library assistant	Katherine Middleton.
Stenographer, Extension Service	Doris Millett.
Clerk, treasurer's office	Mrs. Jessie A. Neill.
Instructor in microbiology	James M. Neill.
Professor of poultry husbandry	Loyal F. Payne.
Extension assistant professor of landscape gardening	William E. Philbrick.
Clerk, Short Courses	Mildred Pierpont.

¹ Died Feb. 22, 1921.

TABLE I. — *Resignations* — Concluded.

POSITION.	Name.
Private secretary, Division of Rural Social Science	Helen M. Rand.
Assistant professor of entomology	William S. Regan. ¹
Assistant supervisor, State home demonstration projects	Marie Sayles.
Clerk, dean's office	Mrs. Mary I. Shore. ²
Clerk, Extension Service	Sadie Shores.
Stenographer, Department of Dairying	Clara Smith.
Stenographer, President's office	Elsie M. Smith.
Stenographer, Department of Agricultural Economics	Mary A. Smith.
Professor of economics and sociology	Robert J. Sprague.
Instructor in home economics	Mrs. Julia G. Strahan.
Instructor in physics	Alfred L. Tower.
Instructor in dairying	Glen E. Upton.
Foreman, Department of Floriculture	James Whiting.

¹ Resignation to take effect Dec. 31, 1921.² Died Jan. 20, 1921.TABLE II. — *New Appointments.*A. *In the Academic Departments.*

POSITION.	Name.	Degrees.
Instructor in physics	George W. Alderman	B. A., Williams College, 1921.
Instructor in microbiology	Roy C. Avery	B.Sc., Connecticut Agricultural College, 1914.
Instructor in English	Carl M. Bogholt	B.Sc., Massachusetts Agricultural College, 1921.
Instructor in physical education	Llewellyn L. Derby	- - -
Assistant professor of agronomy	Wallace C. Forbush ¹	B.Sc., Massachusetts Agricultural College, 1913.
Instructor in poultry husbandry	Earl A. Garde ¹	B.Sc., Massachusetts Agricultural College, 1919.
Instructor in microbiology	Mary E. M. Garvey ¹	B.Sc., Massachusetts Agricultural College, 1920.
Assistant professor of animal husbandry	Guy V. Glatfelter	B.Sc., Pennsylvania State College, 1919; M.Sc., Iowa State College, 1920.
Instructor in home economics	Olga Grizzle	B.Sc., Washington State College, 1914; M.Sc., Washington State College, 1919.
Instructor in vegetable gardening	Harvey F. Jenkins ¹	B.Sc., New Hampshire College, 1917.
Instructor in agronomy	Marshall O. Lanphear	B.Sc., Massachusetts Agricultural College, 1918.
Instructor in agricultural economics	John J. Maginnis	B.Sc., Massachusetts Agricultural College, 1920.
Instructor in physical education	Elton J. Mansell	B.Sc., Massachusetts Agricultural College, 1921.
Assistant professor of agronomy	Charles A. Michels	B.Sc., North Dakota Agricultural College, 1909; M.Sc., University of Wisconsin, 1912.

¹ Temporary.

TABLE II. — *New Appointments* — Continued.A. *In the Academic Departments* — Concluded.

POSITION.	Name.	Degrees.
Instructor in dairying	Harlow L. Pendleton .	B.Sc., Massachusetts Agricultural College, 1915.
Assistant professor in beekeeping .	Norman E. Phillips .	B.Sc., Allegheny College and University of Pennsylvania, 1916.
Instructor in mathematics . . .	Wayland R. Porter .	B.Sc., Carnegie Institute of Technology, 1920.
Assistant professor of horticulture .	Roland W. Rogers .	B.Sc., Massachusetts Agricultural College, 1917.
Professor of poultry husbandry .	William C. Sanctuary .	B.Sc., Massachusetts Agricultural College, 1912.
Instructor in dairying	Richard W. Smith .	B.Sc., Massachusetts Agricultural College, 1921.
Instructor in French	Paul E. Thissell .	A.B., Tufts College, 1921.
Supervisor of placement training .	Paul W. Viets .	- - -
Assistant professor of landscape gardening.	Joseph F. Whitney .	B.Sc., Massachusetts Agricultural College, 1917; M.L.A., Harvard University, 1921.

B. *In the Experiment Station.*

Assistant research professor of chemistry.	John G. Archibald ¹ .	B.Sc., Toronto University, 1916.
Investigator in chemistry . . .	Charles O. Dunbar .	B.Sc., Massachusetts Agricultural College, 1921.
Investigator in pomology . . .	Arthur P. French .	B.Sc., Ohio State University, 1921.
Curator in botany	Anna M. Wallace .	A.B., Smith College, 1913; M.A., Smith College, 1921.

C. *In the Control Service.*

Collector of blood samples, poultry disease elimination.	Ray A. Carter ¹ .	Massachusetts Agricultural College Short Course.
Specialist in charge of poultry disease elimination.	Oliver S. Flint .	B.Sc., Massachusetts Agricultural College, 1917.
Laboratory assistant, poultry disease elimination.	Ann Smith .	- - -

D. *In the Extension Service.*

Extension professor of agronomy .	John B. Abbott ¹ .	B.Sc., University of Vermont; M.Sc., Purdue University.
Extension professor of animal husbandry.	Clifford J. Fawcett .	B.Sc., Ohio State University, 1915.
State home demonstration agent .	Mrs. Harriet H. Haynes ¹	B.Sc., Teachers' College, 1914.
Assistant State club leader . . .	Dorothy W. Murdock .	Framingham State Normal School, Massachusetts.
State leader of home demonstration agents.	Lucile W. Reynolds .	B.Sc., University of Wisconsin, 1921.

¹ Temporary.

TABLE II. — *New Appointments* — Concluded.*E. Miscellaneous.*

POSITION.	Name.	Degrees.
Librarian	Henry S. Green . . .	A.B., Yale University, 1879; LL.D., Bethany College, 1900.
Foreman, Department of Floriculture.	Samuel C. Hubbard . .	— — —
Field agent	Richard A. Mellen . .	B.Sc., Massachusetts Agricultural College, 1921.
Matron, women's dormitory . . .	Mrs. Marie E. White . .	— — —

F. In the Clerical Staff.

POSITION.	Name.
Stenographer, treasurer's office	Mrs. Charlotte E. Abramson.
Stenographer, Extension Service	Mrs. Teresa M. Binner.
Stenographer, Department of Dairying	Genevieve M. Burrington.
Clerk, Extension Service	Mrs. Carolyn Butterworth.
Stenographer, Department of Rural Home Life	Mrs. Ethel L. Carrier.
Stenographer, Division of Agriculture	Irene Chandler.
Clerk, Department of Microbiology and Graduate School	Elizabeth Coleman.
Clerk, Extension Service	Helen R. Connor. ¹
Clerk, Experiment Station	Margaret Eppler.
Clerk, dean's office	Mary A. Evans.
Library assistant	Ethel A. Green.
Private secretary, Graduate School	Elizabeth Hallowell.
Stenographer, Division of Agriculture	Evelyn C. Hubbard.
Stenographer, President's office	Lillian E. Lake.
Stenographer, President's office	Ruth Leban.
Clerk, treasurer's office	Mrs. Gertrude Milne.
Clerk, dean's office	Mildred Pierpont.
Stenographer, library	Frances Powers.
Stenographer, Short Courses	R. Elvera Schuler.
Stenographer, Department of Agricultural Economics	Ruth Sherburne.
Stenographer, Department of Dairying	Clara Smith.
Stenographer, President's office	Elsie M. Smith.
Stenographer, Extension Service	Mrs. Ruth M. Smith.

¹ Temporary.

TABLE III. — *Speakers for the Year.**A. Speakers at Wednesday Assembly for Year ending Nov. 30, 1921.***1920.**

- Dec. 1. — Mr. John H. Reisner, Nanking, China.
 Dec. 8. — Pres. Kenyon L. Butterfield.
 Dec. 15. — Director Sidney B. Haskell, M. A. C.
 Dec. 21. — Dean James A. Beebe, Boston University, Boston.

1921.

- Jan. 5. — Director John D. Willard, M. A. C.
 Jan. 12. — Prof. James W. Crook, Amherst College.
 Jan. 19. — Mr. M. V. Malcom, New York City.
 Jan. 26. — Mr. Thomas A. Watson, Boston.
 Feb. 2. — Student forum.
 Feb. 9. — Dr. Charles E. Marshall, M. A. C.
 Feb. 16. — Bishop Nicholai Velimirovich, Servia.
 Feb. 23. — Dr. John M. Tyler, Amherst College.
 Mar. 2. — Mr. Sumner R. Parker, M. A. C.
 Mar. 9. — Prof. William J. Newlin, Amherst College.
 Mar. 16. — Mr. Daniel Willard, Baltimore, Md.
 Apr. 6. — Prof. Harold Whitehead, Boston University, Boston.
 Apr. 13. — Dr. Edward O. Otis, Boston.
 Apr. 20. — Dr. J. B. Lindsey, Mr. John A. Crawford, Mr. Starr M. King, M. A. C.
 Apr. 27. — Col. Ira L. Reeves, New York City.
 May 4. — Mr. Brayton C. Case, Burma.
 May 11. — Student forum.
 May 18. — Hon. John A. Kingsbury, New York City.
 June 1. — Student forum.
 Oct. 6.¹ — Student forum.
 Oct. 13. — Prof. Fred C. Sears, M. A. C.
 Oct. 20. — Dr. Edward Cummings, Boston.
 Oct. 27. — Prof. Garrett Droppers, Williams College, Williamstown.
 Nov. 3. — Rev. Frederick A. Lietch, Amherst.
 Nov. 10. — Student mass meeting.
 Nov. 17. — Mr. George W. Coleman, Boston.

*B. Speakers at Sunday Chapel for Year ending Nov. 30, 1921.***1920.**

- Jan. 2. — Rev. John Haynes Holmes, New York City.
 Jan. 12. — Mr. Charles Stelzle, New York City.
 Jan. 19. — Dr. Albert Bushnell Hart, Cambridge.

1921.

- Jan. 9. — Bishop Edwin H. Hughes, Malden.
 Jan. 16. — Mr. Peter W. Collins, Boston.
 Jan. 23. — Dr. Albert Parker Fitch, Amherst.
 Jan. 30. — Rev. Herbert J. White, Hartford, Conn.
 Feb. 6. — Dr. Charles Fleischer, Boston.
 Feb. 13. — Mr. Alfred E. Stearns, Andover.
 Feb. 20. — Rev. William Horace Day, Bridgeport, Conn.
 Feb. 27. — Rev. Nehemiah Boynton, Brooklyn, N. Y.
 Mar. 6. — Pres. John M. Thomas, Middlebury, Vt.
 Mar. 13. — Dr. Rockwell H. Potter, Hartford, Conn.
 Mar. 20. — Rev. W. W. Weeks, Richmond, Va.
 Apr. 10. — Dr. D. Brewer Eddy, Boston.
 Apr. 17. — Rev. J. Edgar Park, West Newton.
 Apr. 24. — Dean Charles R. Brown, New Haven, Conn.
 Oct. 2. — Dean Edward M. Lewis, M. A. C.
 Nov. 6. — Rev. B. W. Lockhart, Manchester, N. H.
 Nov. 13. — Rev. William Horace Day, Bridgeport, Conn.

¹ Assembly held on Thursdays, beginning with this date.

TABLE IV. — *Attendance.**A. In Work of College Grade.*

	REGISTRATION NOV. 30, 1920.			REGISTRATION NOV. 30, 1921.		
	Men.	Women.	Total.	Men.	Women.	Total.
Graduate students	41	7	48	53	8	61
Senior class	94	3	97	91	5	96
Junior class	94	5	99	93	8	101
Sophomore class	96	8	104	104	9	113
Freshman class	124	11	135	147	15	162
Unclassified students	9	1	10	—	—	—
Special students	11	2	13	10	3	13
Totals	469	37	506	498	48	546

B. Short Course Enrollment.

Two-Year Course, second year	125	10	135	129	9	138
Two-Year Course, first year .	130	12	142	150	5	155
Vocational Poultry Course .	19	—	19	26	—	26
Unit Course	50	—	50	29	—	29
Totals	314	22	336	334	14	348

C. Other Short Course Enrollment.

	REGISTRATION, 1919-20.			REGISTRATION, 1920-21.		
	Men.	Women.	Total.	Men.	Women.	Total.
School for Country Clergymen	90	—	—	18	1	19
Winter School	90	22	112	69	14	83
Summer School	107	150	257	67	192	259
Summer school for Federal men	65	—	65	65	—	65
Totals	262	172	434	219	207	426

TABLE IV. — *Attendance* — Concluded.*D. Convention Registration.*

	1920.	1921.
State institutional superintendents and farmers	—	50
Polish farmers' day	—	100
Farmers' week and annual poultry convention	1,701	3,000
Junior boys' and girls' prize winners' camp	346	95
Girls' camp (paid)	—	14
Boys' camp (paid)	—	34
One-day campers (boys and girls)	—	198
Extension workers' conference	85	80
Sheep breeders' conference	—	212
Clothing efficiency conferences (2) for paid leaders	—	14
Clothing efficiency conference for local leaders	—	53
Totals	2,132	3,850

TABLE V. — *Legislative Budget, 1921.*

ITEMS.	Amount asked.	Amount granted.
Miscellaneous improvements and equipment	\$75,000	\$25,000
Chemistry laboratory	600,000	—
Improvements at power plant	76,000	—
Addition to rural engineering building	30,000	—
Purchase of Brooks' Farm	21,400	—
Tennis courts and gymnasium for women students	13,500	—
Administration building, Market-Garden Field Station	10,000	10,000
Equipment for Tillson Farm	10,000	—
Poultry breed and judging laboratory	8,000	—
House for farm superintendent	8,000	—
Macadam road	8,000	—
	\$859,900	\$35,000

TABLE VI. — *Current Account, State Funds.*

	Requested 1921.	Appro- priated 1921.	Deficiency Appro- piation. ¹	Expended 1921.	Balance.
Personal services: —					
Administration	\$42,895	\$40,460	—	\$40,100 15	\$359 85
Instruction	207,165	188,915	\$80 00	171,177 00	17,818 00
General maintenance . .	132,377	118,000	120 69	119,033 63	—912 94
Experiment Station . . .	81,481	59,500 ²	100 70	56,471 66	3,129 04
Extension Service	62,360	47,300	—	46,884 54	415 46
Market-Garden Field Station	6,000	6,000	—	5,689 49	310 51
Short Courses	45,133	39,350	—	42,759 70	—3,409 70
Travel, office, and other ex- penses.	53,175	46,000	1,967 16	50,037 86	—2,070 70
Teaching, laboratory supplies and equipment.	71,960	58,000	890 70	58,869 69	21 01
Experiment Station:—					
Supplies, equipment and publications.	19,905	12,000 ²	213 76	13,389 10	—1,175 34
Travel and office expenses .	5,375	3,300	37 70	3,980 24	—642 54
Extension Service, supplies, equipment, travel, etc.	67,200	36,000	727 03	37,139 56	—412 53
Short Courses	20,275	15,000	167 45	10,319 05	4,848 40
Heat, light, and power . .	74,000	60,000	1,192 22	72,266 49	—11,074 27
Farm	27,295	26,000	841 94	24,938 97	1,902 97
Repairs, ordinary	35,000	25,000	148 39	26,095 14	—946 75
Replacements	5,000	—	—	—	—
Market-Garden Field Station .	3,000	3,000	72 13	3,031 49	40 64
Fertilizer law control . .	14,500	12,500	95 03	12,515 18	79 85
Poultry disease law . . .	6,000	5,000	—	4,724 65	275 35
Milk-testing inspection law .	600	550	19 96	564 63	5 33
Trustees' expenses	1,200	1,200	57 29	1,220 75	36 54
Printing reports	5,500	5,000	203 87	1,836 97	3,366 90
Commercial feedstuffs . . .	8,000	7,000	23 35	6,954 09	69 26
Totals	\$998,396	\$815,075	\$6,959 37	\$810,000 03	\$12,034 34

¹ Deficiency appropriation to meet expenses incurred in 1919-20.² \$2,000 transferred from original appropriation for experiment station supplies to personal service.

TABLE VII. — *Statistics of Freshmen entering Massachusetts Agricultural College, September, 1921.*A. *Home Addresses of Students (classified by Towns and Cities).*

Abington 1	Gill 1	NORTHAMPTON 3
ALLENTOWN, PA. 1	Glastonbury, Conn. 1	Northfield 1
Altamont, N. Y. 1	Greenwich 1	Palmer 1
Amherst 11	Groveland 1	PANAMA CITY, R. P. 1
Arlington 3	Hadley 1	Peekskill, N. Y. 1
Ashland 1	Hatfield 2	PHILADELPHIA, PA. 1
Auburn 1	HOLYOKE 7	PITTSFIELD 1
Barnstable 1	Hudson 2	PROVIDENCE, R. I. 1
Barre 1	JACKSONVILLE, FLA. 1	Provincetown 1
Belchertown 1	Kars, Armenia 1	Reading 2
Bernardston 2	Kingston, Md. 1	Richmond 1
BEVERLY 1	Kingston 1	Rockland 2
BOSTON 13	LAWRENCE 2	Saugus 2
Bridgewater 2	Lee 2	Shelburne 2
BROCKTON 4	Lexington 1	South Hadley 1
CAMBRIDGE 1	Littleton 1	Spencer 1
Chatham 1	LOWELL 1	SPRINGFIELD 8
Chelmsford 1	MALDEN 1	Springfield, Vt. 1
CHELSEA 1	Mansfield 1	Sterling 1
Chester 1	Marblehead 1	Stow 1
Columbia City, Ind. 1	Medfield 2	TAUNTON 1
Cumberland Center, Me. 1	MELROSE 5	Wareham 1
Dalton 3	Methuen 1	Warren 1
East Bridgewater 3	Millis 1	Weehawken, N. J. 1
Easthampton 1	Millville 2	West Bridgewater 1
Englewood, N. J. 1	Monson 1	Weston 1
EVERETT 1	Montague 2	Weymouth 1
FALL RIVER 1	NEW BEDFORD 1	Winchester 1
Falmouth 1	NEWBURYPORT 1	WORCESTER 3
FITCHBURG 1	NEWTON 1	Worthington 1
Framingham 2	NEW YORK, N. Y. 3	
Gardner 1	NORTH ADAMS 1	

B. *Home Addresses (classified by States).*

	Number.	Per Cent.		Number.	Per Cent.
Armenia	1	.61	New Jersey	2	1.22
Connecticut	1	.61	New York	5	3.07
Florida	1	.61	Pennsylvania	2	1.22
Indiana	1	.61	Republic of Panama	1	.61
Maine	1	.61	Rhode Island	1	.61
Maryland	1	.61	Vermont	1	.61
Massachusetts	144	89.00		162	100.00

TABLE VII. — *Statistics of Freshmen entering Massachusetts Agricultural College, September, 1921 — Continued.**C. Home Addresses (classified by Counties of Massachusetts).*

	Number.	Per Cent.		Number.	Per Cent.
Barnstable . . .	4	2.78	Middlesex . . .	26	18.06
Berkshire . . .	8	5.56	Norfolk . . .	4	2.78
Bristol . . .	4	2.78	Plymouth . . .	15	10.41
Essex . . .	9	6.26	Suffolk . . .	14	9.72
Franklin . . .	8	5.55	Worcester . . .	12	8.34
Hampden . . .	18	12.49		144	100.00
Hampshire . . .	22	15.27			

D. Nativity of Parents.

	Number.	Per Cent.
Neither parent foreign born	104	64.20
Both parents foreign born	32	19.75
Father (only) foreign born	14	8.64
Mother (only) foreign born	10	6.17
No statistics	2	1.22
	162	99.98

E. Education of Father.

	Number.	Per Cent.
Common school	67	41.36
High school	43	26.54
Business school	19	11.74
College or university	28	17.29
No statistics	5	3.07
	162	100.00

TABLE VII. — *Statistics of Freshmen entering Massachusetts Agricultural College, September, 1921 — Continued.**F. Religious Census.*

	MEMBERSHIP.		PREFERENCE.		TOTALS.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Baptist	11	6.79	3	1.86	14	8.64
Catholic	22	13.58	—	—	22	13.58
Congregationalist . . .	36	22.22	14	8.64	50	30.86
Episcopal	11	6.79	—	—	11	6.79
Methodist	15	9.26	3	1.86	18	11.11
Presbyterian	3	1.86	—	—	3	1.86
Unitarian	10	6.17	2	1.22	12	7.41
Universalist	3	1.86	1	.61	4	2.47
Miscellaneous	25	15.43	2	1.22	27	16.67
No statistics	1	.61	—	—	1	.61
	137	84.57	25	15.41	162	100.00

G. Occupation of Father.

	Number.	Per Cent.
Agriculture and horticulture	33	20.37
Artisans	41	25.31
Business	44	27.16
Deceased or no statistics	16	9.88
Miscellaneous	13	8.02
Professional	15	9.26
	162	100.00

H. Intended Vocation of Student.

	Number.	Per Cent.
Agriculture or horticulture (practical)	67	41.36
Agriculture or horticulture (professional)	48	29.63
Professions	7	4.32
Miscellaneous	11	6.79
Undecided or no statistics	29	17.90
	162	100.00

TABLE VII. — *Statistics of Freshmen entering Massachusetts Agricultural College, September, 1921 — Concluded.**I. Farm Experience.*

	Number.	Per Cent.
Brought up on a farm	48	29.63
Not brought up on a farm and having no or practically no farm experience.	37	22.84
Not brought up on a farm, but having had some farm experience.	77	47.53
	162	100.00

J. Miscellaneous Statistics.

Average age 19.48 years

TABLE VIII. — *Cases treated at the Infirmary Dec. 1, 1920, to Nov. 30, 1921.*

	Daily Count.	Individual.
1920		
December 1 to 31:		
House cases	77	6
Out-patients	52	23
1921		
January 1 to 31:		
House cases	61	10
Out-patients	99	34
February 1 to 28:		
House cases	69	14
Out-patients	80	36
March 1 to 31:		
House cases	120	66
Out-patients	15	34
April 1 to 30:		
House cases	101	16
Out-patients	22	19
May 1 to 31:		
House cases	90	8
Out-patients	85	24
June 1 to 30:		
House cases	19	3
Out-patients	19	11
July 1 to 31:		
House cases	6	2
Out-patients	13	13
September 23 to 30:		
House cases	9	3
Out-patients	4	4
October 1 to 31:		
House cases	76	16
Out-patients	74	35
November 1 to 30:		
House cases	44	6
Out-patients	135	55
Number of house cases		672
Number of out-patients		598
Total		1,270
Number cared for in the house		150
Number cared for as out-patients		288
Total		438

REPORT OF THE TREASURER

FOR THE FISCAL YEAR ENDING NOV. 30, 1921.

BALANCE SHEET.

	DR.	CR.
1920		
Dec. 1. To balance on hand	\$37,319 99	
1921		
Nov. 30. To departmental income	127,644 16	
Nov. 30. To receipts from State Treasurer	822,439 69	
Nov. 30. To September, October, and November, 1920, schedule	116,185 56	
Nov. 30. To refunds to State Treasurer	105 68	
Nov. 30. To receipts from United States Treasurer	126,219 69	
Nov. 30. To November schedule in transit	79,862 45	
Nov. 30. Expenditures of September, October, and November, 1920, paid in this fiscal year.		\$116,185 56
Nov. 30. Refunds transferred to State Treasurer		105 68
Nov. 30. Expenditures for fiscal year		1,038,231 03
Nov. 30. Income transferred to State Treasurer		127,644 16
Nov. 30. Balance on hand		30,227 89
Nov. 30. Journal transfer	2,617 10	
	\$1,312,394 32	\$1,312,394 32

STATEMENT OF LEGISLATIVE APPORTIONMENT AND EXPENDITURES FOR FISCAL YEAR ENDING NOV. 30, 1921, AND APPORTIONMENT REQUESTED FOR 1922.

	Apportionment for Last Fiscal Year.	Expenditures.	Requested Apportionment for New Fiscal Year.
College:			
Personal services . . .	\$347,575 69	\$330,310 78	\$366,535 00
Maintenance . . .	220,040 41	232,208 15	219,000 00
	\$567,616 10	\$562,518 93	\$585,535 00
Experiment Station:			
Personal services . . .	\$59,600 70	\$56,471 66	\$66,075 00
Maintenance . . .	15,551 46	17,369 34	24,835 00
	75,152 16	73,841 00	90,910 00

STATEMENT OF LEGISLATIVE APPORTIONMENT AND EXPENDITURES FOR
FISCAL YEAR ENDING NOV. 30, 1921, AND APPORTIONMENT RE-
QUESTED FOR 1922 — *Concluded.*

	Apportionment for Last Fiscal Year.	Expenditures.	Requested Apportionment for New Fiscal Year.
Extension Service:			
Personal services . . .	\$47,300 00	\$46,884 54	\$59,780 00
Maintenance . . .	36,727 03	37,139 56	44,000 00
	\$84,027 03	\$84,024 10	\$103,780 00
Short Courses:			
Personal services . . .	\$39,350 00	\$42,759 70	\$53,640 00
Maintenance . . .	15,167 45	10,319 05	19,235 00
	54,517 45	53,078 75	72,875 00
Market-Garden Field Station: —			
Personal services . . .	\$6,000 00	\$5,689 49	\$6,500 00
Maintenance . . .	3,072 13	3,031 49	3,825 00
	9,072 13	8,720 98	10,325 00
Trustees, travel . . .	\$1,257 29	\$1,220 75	\$1,200 00
Printing reports . . .	5,203 87	1,836 97	5,000 00
Commercial feedstuffs . .	7,023 35	6,954 09	8,000 00
Totals . . .	13,484 51	10,011 81	14,200 00
Fertilizer law . . .	\$12,595 03	\$12,515 18	\$14,500 00
Poultry law . . .	5,000 00	4,724 65	6,500 00
Milk-testing law . . .	569 96	564 63	700 00
Totals . . .	18,164 99	17,804 46	21,700 00
Miscellaneous improve- ments and equipment	— —	— —	— 75,000 00
Totals . . .	— \$822,034 37	— \$810,000 03	— \$974,325 00
Balance unexpended . . .	— —	— 12,034 34	— —
	— —	— \$822,034 37	— —

CASH STATEMENT.

	Other Funds.	State Funds.	Totals.
Balance Dec. 1, 1920	\$37,319 99	—	\$37,319 99
<i>Receipts.</i>			
College receipts from students and others	—	—	17,325 67
Tuition	—	\$3,322 02	
Laboratory fees	—	6,091 68	
Rents	—	7,911 97	
Department sales	—	—	75,201 65
Produce	—	64,533 83	
Miscellaneous	—	10,667 82	
Experiment Station	—	—	9,465 84
Cranberry receipts	—	6,318 34	
Chemical receipts	—	1,490 48	
Miscellaneous	—	1,657 02	
Extension Service	—	—	1,131 44
Correspondence Courses	—	716 85	
Miscellaneous	—	414 59	
Short Courses	—	—	4,921 85
Students' fees	—	4,491 85	
Summer School	—	—	
Winter School	—	430 00	

CASH STATEMENT — *Concluded.*

	Other Funds.	State Funds.	Totals.
<i>Receipts — Concluded.</i>			
Market-Garden Field Station	-	-	\$3,071 14
Produce	-	\$3,071 14	
Fertilizer law	-	14,465 39	14,465 39
Milk-testing law	-	678 84	678 84
Poultry law	-	1,382 34	1,382 34
Treasurer of the Commonwealth	-	-	822,439 69
Maintenance	-	739,328 89	
Special appropriation	-	79,771 44	
Endowment	\$3,339 36	-	
Federal government	-	-	126,219 69
Land grant of 1862	7,300 00	-	
Hatch fund of 1887	15,000 00	-	
Morrill fund of 1890	16,666 67	-	
Adams fund of 1906	15,000 00	-	
Nelson fund of 1907	16,666 66	-	
Smith-Lever fund of 1914	31,262 06	-	
Short Course, two years	24,324 30	-	
November schedules in transit	-	79,862 45	79,862 45
Journal transfer	-	2,617 10	2,617 10
	\$166,879 04	\$1,029,224 04	\$1,196,103 08
<i>Payments.</i>			
College expenses	-	-	\$610,230 32
Personal services	\$44,819 97	\$330,310 78	
Maintenance	2,891 42	232,208 15	
Experiment Station	-	-	103,591 02
Personal services	29,434 08	56,471 66	
Maintenance	315 94	17,369 34	
Extension service	-	-	118,127 71
Personal services	32,988 50	46,884 54	
Maintenance	1,115 11	37,139 56	
Short Courses	-	-	78,164 88
Personal services	21,467 67	42,759 70	
Maintenance	3,618 46	10,319 05	
Market-Garden Field Station	-	-	8,720 98
Personal services	-	5,689 49	
Maintenance	-	3,031 49	
Trustees, travel	-	1,220 75	1,220 75
Printing reports	-	1,836 97	1,836 97
Commercial feedstuffs	-	6,954 09	6,954 09
Fertilizer law	-	12,515 18	12,515 18
Poultry law	-	4,724 65	4,724 65
Milk-testing law	-	564 63	564 63
Special appropriations	-	-	91,579 85
1919, women's dormitory	-	21,164 19	
1919, engineering study	-	62 82	
1920, stable for cavalry unit	-	13,716 61	
1921, improvements and equipment	-	47,305 22	
1921, Market-Garden Field Station, administration building	-	7,331 01	
1921, architect's fees, chemistry building	-	2,000 00	
Income	-	127,644 16	127,644 16
Balance	30,227 89	-	30,227 89
	\$166,879 04	\$1,029,224 04	\$1,196,103 08

CLASSIFICATION OF INCOME FROM STUDENTS AND OTHERS.

	Laboratory Fees.	Department Sales.	Rent.	Miscellaneous.	Tuition.	Totals.
Agricultural economics	-	-	-	\$1 55	-	\$1 55
Agronomy	\$324 50	-	-	31 47	-	355 97
Animal husbandry .	215 50	-	-	-	-	215 50
Beekeeping	-	\$20 50	-	-	-	20 50
Botany	562 50	-	-	-	-	562 50
Chemistry	2,665 79	-	-	18 70	-	2,684 49
Dairying	240 50	27,297 31	-	-	-	27,537 81
Domestic science .	36 50	-	-	13 68	-	50 18
Entomology	96 00	-	-	2 46	-	98 46
Farm	-	15,400 37	-	333 59	-	15,733 96
Farm management .	88 00	-	-	-	-	88 00
Floriculture	181 00	4,499 41	-	-	-	4,680 41
Forestry	72 00	-	-	-	-	72 00
General horticulture .	-	-	-	477 50	-	477 50
Grounds	-	-	-	2 75	-	2 75
Horticultural manufactures.	-	697 45	-	-	-	697 45
Hospital	-	-	-	1,190 90	-	1,190 90
Landscape gardening .	389 00	-	-	-	-	389 00
Language and literature.	146 00	-	-	-	-	146 00
Library	-	-	-	111 62	-	111 62
Mathematics	47 00	-	-	4 20	-	51 20
Microbiology	452 18	-	-	324 74	-	776 92
Mount Toby	-	1,621 78	-	-	-	1,621 78
Physics	72 00	-	-	2 25	-	74 25
Pomology	95 00	2,540 57	-	-	-	2,635 57
Poultry husbandry .	49 50	9,557 58	-	-	-	9,607 08
Rural engineering .	186 00	-	-	29 95	-	215 95
Rural sociology . . .	-	-	-	1 80	-	1 80
Vegetable gardening .	130 50	2,898 86	-	-	-	3,029 36
Veterinary	68 00	-	-	-	-	68 00
Zoölogy and geology .	482 00	-	-	-	-	482 00
Operating and maintenance.	-	-	\$85 00	3,954 23	\$3,322 02	7,361 25
General expense (cash credits).	-	-	-	1,937 28	-	1,937 28
Adams Hall	-	-	4,837 98	13 67	-	4,851 65
Draper Hall	-	-	912 00	-	-	912 00
North dormitory . .	-	-	1,859 13	-	-	1,859 13

CLASSIFICATION OF INCOME FROM STUDENTS AND OTHERS — *Concluded.*

	Laboratory Fees.	Department Sales.	Rent.	Miscellaneous.	Tuition.	Totals.
South dormitory . .	-	-	\$1,214 86	-	-	\$1,214 86
College residences . .	-	-	616 54	-	-	616 54
Dean's office . .	-	-	-	\$0 10	-	10
President's office . .	-	-	-	24 11	-	24 11
Registrar's office . .	-	-	-	50	-	50
Treasurer's office . .	-	-	-	69 44	-	69 44
Totals . . .	\$6,599 47	\$64,533 83	\$9,525 51	\$8,546 49	\$3,322 02	\$92,527 32

ANALYSIS OF COLLEGE EXPENDITURES.

ADMINISTRATION.	Office Expense.	Salaries and Labor.	Travel.	Minor Equip- ment.	Building Supplies.	Publicity and Lectures.	Student Activity.	Com- mence- ment.	Miscel- laneous.	Totals.
Dean's office	\$395 96	\$309 24	-	\$12 18	-	-	-	-	-	\$717 38
Executive order	-	-	\$2,367 83	-	-	\$2,876 58	\$121 00	\$1,526 99	\$6,846 43	13,738 83
President's office	2,140 54	196 75	156 78	3 87	\$0 60	-	-	-	151 57	2,650 11
Registrar's office	636 87	102 28	61 22	1 36	-	-	-	-	-	801 73
Treasurer's office	1,086 11	322 22	204 82	115 51	26 26	-	-	-	120 04	1,964 96
Administration (salaries)	-	40,100 15	-	-	-	-	-	-	-	40,100 15
Totals	\$4,259 48	\$41,030 64	\$2,880 65	\$132 92	\$26 86	\$2,876 58	\$121 00	\$1,526 99	\$7,118 04	\$59,973 16

MAINTENANCE.	Office Expense.	Labor.	Laboratory Supplies.	Minor Equip- ment.	Building Supplies.	Travel.	General Expense.	Miscel- laneous.	Salaries.	Totals.
Academic maintenance:										
Agricultural economics	\$90 23	\$144 75	\$60 71	\$43 31	-	\$61 31	-	\$43 86	-	\$444 17
Agricultural education	281 27	24 50	3 68	9 88	-	44 75	-	15 96	-	380 04
Agronomy	169 42	326 19	267 58	404 69	-	62 84	-	-	-	1,230 72
Animal husbandry	148 13	57 06	97 30	5 38	-	363 41	-	-	-	671 28

Beekeeping	—	310 03	100 87	87 36	\$18 63	—	—	—	516 59
Botany	240 84	962 11	486 20	85 12	99 21	7 50	—	2 30	1,833 28
Chemistry	159 74	1,100 79	3,807 32	22 37	199 13	26 29	—	3 00	5,318 54
Dairying	220 08	7,376 39	27,767 55	385 41	410 47	196 69	—	—	36,356 59
Domestic science	343 18	228 34	400 86	150 57	—	451 86	—	4 17	1,581 98
Economics and sociology	73 31	289 40	29 28	—	—	—	—	—	391 99
Entomology	96 41	409 79	78 26	6 15	123 86	—	—	—	714 47
Farm management	175 28	24 73	133 24	82 44	—	116 89	—	—	532 58
Floriculture	88 71	6,251 79	1,557 84	119 32	71 73	54 40	—	—	8,143 79
Forestry	9 04	133 17	128 10	1 04	5 18	—	—	—	276 53
General agriculture	—	2,143 06	—	120 02	330 98	—	—	129 69	2,723 75
Horticulture manufactures	112 89	1,485 04	1,530 61	177 76	—	17 95	—	—	3,324 25
Hospital	—	2,382 72	—	89 93	—	—	\$1,941 98	—	4,414 63
Landscape gardening	19 41	2 53	286 90	143 14	—	20 17	—	2 32	474 47
Language and literature	69 48	14 26	102 33	21 27	—	13 00	—	—	220 34
Mathematics	74 23	106 75	35 00	—	24 80	—	—	—	240 78
Microbiology	87 46	701 05	502 53	511 65	88 30	13 24	—	—	1,904 23
Military science	116 65	299 07	—	333 39	369 43	15 39	—	51 24	1,401 50
Mount Toby	—	3,169 34	—	22 71	—	—	—	67 77	3,259 82
Physical education	142 02	293 58	366 90	—	54 61	257 33	—	—	1,114 44
Physics	30 42	241 59	306 76	47 47	26 62	—	—	29 98	682 84
Pomology	100 94	3,751 96	803 64	141 30	—	113 11	—	—	4,910 95

ANALYSIS OF COLLEGE EXPENDITURES — *Concluded.*

MAINTENANCE.	Office Expense.	Labor.	Laboratory Supplies.	Minor Equip- ment.	Building Supplies.	Travel.	General Expense.	Miscel- laneous.	Salaries.	Totals.
Poultry husbandry	\$834 17	\$4,976 76	\$10,348 17	\$195 33	\$58 21	\$133 28	-	-	-	\$16,545 92
Rural engineering	72 75	141 90	321 33	222 13	148 23	26 51	-	-	-	932 85
Rural sociology	56 85	12 90	-	-	-	12 00	-	-	-	81 75
Rural social science	31 35	-	-	-	-	-	-	-	-	31 35
Vegetable gardening	168 93	4,612 93	1,060 27	132 17	214 81	259 88	-	\$38 11	-	6,487 10
Veterinary	77 09	361 10	838 03	93 15	25 98	10 17	-	-	-	1,405 52
Women's dormitory	26 13	2,403 95	-	393 71	135 56	-	-	118 46	-	3,137 81
Zoölogy and geology	21 11	323 19	192 57	71 39	5 23	42 08	-	-	-	655 57
General maintenance:										
Farm	-	17,251 97	-	-	-	-	\$24,938 97	-	-	42,190 94
General horticulture	305 94	4,627 95	-	1,211 90	-	42 62	1,413 93	920 32	-	8,522 66
Graduate School	49 50	42 36	-	-	-	-	-	-	-	91 86
Grounds	-	7,424 46	-	187 79	-	-	554 21	139 75	-	8,306 21
Library	588 25	1,474 26	-	170 06	78 41	200 44	6,421 14	-	-	8,942 56
General expense	-	-	-	-	-	-	1,937 28	-	-	1,937 28
Operating and maintenance	-	40,796 74	-	-	-	-	111,699 71	-	-	152,496 45
Totals	\$5,091 21	\$116,740 46	\$51,613 73	\$5,689 31	\$2,489 38	\$2,566 11	\$149,123 55	\$1,566 93	-	\$334,880 68

Instruction (salaries)	.	.	.	.	-	-	-	-	-	\$171,177 00	\$171,177 00
Morrill fund	.	.	.	.	-	-	-	-	-	17,033 35	17,033 35
Nelson fund	.	.	.	.	-	-	-	-	-	17,033 33	17,033 33
Endowment fund	.	.	.	.	-	-	-	-	2,891 42	10,763 29	13,644 71
Income to State Treasurer	.	.	.	.	-	-	-	-	-	92,527 32	92,527 32
Administration	.	.	.	.	-	-	-	-	-	\$646,296 39	\$646,296 39
Less refunds	.	.	.	.	-	-	-	-	-	59,973 16	59,973 16
Grand total	.	.	.	.	-	-	-	-	-	\$706,289 55	\$706,289 55
					-	-	-	-	-	89 00	89 00
					-	-	-	-	-	\$706,180 55	\$706,180 55

CURRENT ACCOUNTS, 1921.

Disbursements and Receipts.

ACCOUNTS.	Disbursements from Nov. 30, 1920, to Nov. 30, 1921.	Receipts from Nov. 30, 1920, to Nov. 30, 1921.	Apportionment for Year ending Nov. 30, 1921.	Balance for Credit.
Administration:				
Dean's office	\$717 38	\$0 10	\$600 00	—\$117 38
Executive order	13,738 83	—	15,000 00	1,261 17
President's office	2,650 11	24 11	2,200 00	—450 11
Registrar's office	801 73	50	800 00	—1 73
Salaries	40,100 15	—	40,460 00	359 85
Treasurer's office	1,964 96	69 44	1,650 00	—314 96
Maintenance, academic:				
Agricultural economics	444 17	1 55	550 00	105 83
Agricultural education	380 04	—	400 00	19 96
Agronomy	1,230 72	355 97	1,200 00	—30 72
Animal husbandry	671 28	215 50	700 00	28 72
Beekeeping	516 89	20 50	500 00	—16 89
Botany	1,883 28	562 50	1,750 00	—133 28
Chemistry	5,318 54	2,684 49	5,200 00	—118 54
Dairying	36,356 59	27,537 81	36,500 00	143 41
Domestic science	1,581 98	50 18	1,600 00	18 02
Economics and sociology	391 99	—	400 00	8 01
Entomology	714 47	98 46	800 00	85 53
Farm management	532 58	88 00	500 00	—32 58
Floriculture	8,143 79	4,680 41	8,000 00	—143 79
Forestry	276 53	72 00	250 00	—26 53
General agriculture	2,723 75	—	2,570 00	—153 75
Horticultural manufactures	3,324 25	697 45	3,500 00	175 75
Hospital	4,414 63	1,190 90	3,225 00	—1,189 63
Landscape gardening	474 47	389 00	500 00	25 53
Language and literature	220 34	146 00	400 00	179 66
Mathematics	240 78	51 20	250 00	9 22
Microbiology	1,904 23	776 92	1,800 00	—104 23
Military science	1,401 50	—	1,600 00	198 50
Mount Toby	3,259 82	1,621 78	3,500 00	240 18
Physical education	1,114 44	—	1,200 00	85 56
Physics	682 84	74 25	700 00	17 16
Pomology	4,910 95	2,635 57	5,325 00	414 05
Poultry husbandry	16,545 92	9,607 08	16,000 00	—545 92
Rural engineering	932 85	215 95	850 00	—82 85
Rural sociology	81 75	1 80	300 00	218 25
Rural social science	31 35	—	200 00	168 65
Vegetable gardening	6,487 10	3,029 36	7,500 00	1,012 90
Veterinary	1,405 52	68 00	1,300 00	—105 52
Women's dormitory	3,137 81	4,851 65	2,700 00	—437 81
Zoology and geology	655 57	482 00	650 00	—5 57
Maintenance, general:				
Farm	42,190 94	15,733 96	41,500 00	—690 94
General horticulture	8,522 66	477 50	10,000 00	1,477 34
Graduate school	91 86	—	100 00	8 14
Grounds	8,306 21	2 75	8,500 00	193 79
Library	8,942 56	111 62	7,500 00	—1,442 56
General expense	1,937 28	1,937 28	—	—
Operating and maintenance	152,496 45	11,963 78	136,000 00	—16,496 45
Endowment fund	13,644 71	10,639 36	10,613 32	3,650 00
Instruction:				
Salaries	171,177 00	—	188,915 00	17,738 00
United States Treasurer, Morrill fund	17,033 35	16,666 67	16,666 67	9,722 22
United States Treasurer, Nelson fund	17,033 33	16,666 66	16,666 66	9,722 21
State Treasurer, account of schedules	—	562,518 93	—	—
Income to State Treasurer	92,527 32	—	—	—
Plus journal entries	\$706,269 55	\$699,018 94	\$609,591 65	\$24,645 87
Less refunds	89 00	3,422 91	—	—
	\$706,180 55	\$702,441 85	—	—
Balance beginning fiscal year Dec. 1, 1920	—	26,833 13	—	—
Balance on hand Nov. 30, 1921	23,094 43	—	—	—
	\$729,274 98	\$729,274 98	—	—

COLLEGE ACCOUNTS.

Comparative Disbursements and Receipts for 1920-21.

ACCOUNTS.	DISBURSEMENTS.		RECEIPTS.	
	1920.	1921.	1920.	1921.
Agricultural economics	\$508 63	\$444 17	—	\$1 55
Agricultural education	461 66	380 04	—	—
Agromony	1,152 74	1,230 72	\$212 95	355 97
Animal husbandry	701 03	671 28	342 00	215 50
Beekeeping	482 57	516 89	145 85	20 50
Botany	1,617 02	1,883 28	497 00	562 50
Chemistry	5,030 82	5,318 54	2,499 69	2,684 49
Dairying	39,164 74	36,356 59	29,805 99	27,537 81
Dean's office	603 45	717 38	—	10
Domestic science	1,822 95	1,581 98	—	50 18
Economics and sociology	71 43	391 99	—	—
Entomology	605 14	714 47	131 00	98 46
Executive order	10,841 62	13,738 83	—	—
Farm	61,369 34	42,190 94	41,599 81	15,733 96
Farm management	588 76	532 58	172 50	88 00
Floriculture	7,024 55	8,143 79	5,530 80	4,680 41
Forestry	165 08	276 53	12 00	72 00
General agriculture	2,398 08	2,723 75	—	—
General horticulture	8,742 43	8,522 66	342 26	477 50
Graduate school	51 40	91 86	—	—
Grounds	7,486 07	8,306 21	22 30	2 75
Horticultural manufactures	3,311 36	3,324 25	601 15	697 45
Hospital	3,121 28	4,414 63	758 92	1,190 90
Landscape gardening	479 42	474 47	386 00	389 00
Language and literature	355 66	220 34	202 00	146 00
Library	7,700 67	8,942 56	34 94	111 62
Mathematics	200 36	240 78	84 00	51 20
Microbiology	1,448 27	1,904 23	540 38	776 92
Military	1,296 83	1,401 50	12 28	—
Mount Toby	393 48	3,259 82	585 11	1,621 78
Physical education	1,125 72	1,114 44	—	—
Physics	661 61	682 84	93 85	74 25
Pomology	5,941 88	4,910 95	4,003 45	2,635 57
Poultry husbandry	13,638 17	16,545 92	9,355 08	9,607 08
President's office	2,324 00	2,650 11	25 29	24 11
Registrar's office	797 83	801 73	15	50
Rural engineering	639 11	932 85	262 50	215 95
Rural sociology	88 35	81 75	—	1 80
Rural social science	—	51 35	—	—
Salaries	187,402 56	211,277 15	—	—
Treasurer's office	1,943 66	1,964 96	76 08	69 44
Vegetable gardening	6,018 22	6,487 10	3,096 25	3,029 36
Veterinary science	1,456 27	1,405 52	25 28	68 00
Women's dormitory	—	3,137 81	—	4,851 65
Zoology and geology	592 79	655 57	385 00	482 00
General expense	1,453 61	1,937 28	1,453 61	1,937 28
Operating and maintenance	130,948 01	152,496 45	12,761 54	11,963 78
State Treasurer:				
Endowment fund	7,350 53	13,644 71	10,613 32	10,639 36
United States Treasurer:				
Morrill fund	16,371 24	17,033 35	16,666 67	16,666 67
Nelson fund	16,371 26	17,033 33	16,666 66	16,666 66
State Treasurer, account of schedules	—	—	527,147 56	562,518 93
Income to State Treasurer	116,546 75	92,527 32	—	—
	\$680,863 41	\$706,269 55	\$687,652 22	\$699,018 94
Less journal entries and refunds	—11 26	—89 00	—11 26	+13,422 91
	\$680,852 15	\$706,180 55	\$687,640 96	\$702,441 85
Less amount transferred from Experiment Station	—	—	2,935 19	—
	\$680,852 15	\$706,180 55	\$684,705 77	\$702,441 85
Balance beginning fiscal year	—	—	22,979 51	26,833 13
Balance on hand at close of fiscal year	26,833 13	23,094 43	—	—
	\$707,685 28	\$729,274 98	\$707,685 28	\$729,274 98

COLLEGE ACCOUNTS — *Concluded.**Summary.*

	Disbursements.	Receipts.
Cash on hand Dec. 1, 1920	—	\$26,833 13
Institution receipts Nov. 30, 1921	—	92,527 32
State Treasurer's receipts Nov. 30, 1921	—	562,518 93
United States Treasurer's receipts Nov. 30, 1921	—	33,333 33
State Treasurer, endowment fund	—	10,639 36
Total disbursements	\$610,230 32	—
Receipts turned in to State Treasurer	92,527 32	—
	\$702,757 64	\$725,852 07
Bills receivable Dec. 1, 1920, deducted	—	8,773 84
Bills payable Dec. 1, 1920, deducted	1,785 17	—
	\$700,872 47	\$717,078 23
Bills receivable Nov. 30, 1921	—	8,552 48
Bills payable Nov. 30, 1921	3,801 17	—
Balance	20,957 07	—
	\$725,630 71	\$725,630 71

FARM DISBURSEMENTS.

	Labor.	Equip- ment.	Feed.	Supplies.	Sundry.	Bedding.	Fertilizer.	Seeds.	Improve- ments.	Totals.
Dairy cattle	\$5,539 81	\$419 55	\$183 37	\$515 59	\$761 30	-	-	-	-	\$7,419 62
Horses	1,365 55	199 89	-	47 05	335 24	-	-	-	-	1,947 73
Sheep	1,225 36	35 16	-	6 77	81 26	-	-	-	-	1,348 55
Live stock	426 69	-	9,920 98	2 45	148 36	\$2,354 34	-	-	-	12,701 91
Swine	1,319 81	112 58	334 50	10 24	-	-	-	-	-	1,917 70
Field crops	4,586 18	-	-	387 47	-	-	\$896 92	\$350 58	-	5,843 92
Tools and machinery	480 42	1,520 24	-	488 97	98 07	-	-	-	-	2,388 13
Miscellaneous	2,308 25	-	-	-	-	-	-	-	\$5,728 09	8,623 38
Totals	\$17,251 97	\$2,287 42	\$10,438 85	\$1,458 54	\$1,424 23	\$2,354 34	\$896 92	\$350 58	\$5,728 09	\$42,190 94

FARM CREDITS.

	Milk.	Stock.	Sundry.	Labor.	Field Crops.	Tools and Machinery.	Improve- ments.	Totals.
Dairy cattle	\$10,014 78	\$1,168 96	\$318 48	-	-	-	-	\$11,502 22
Horses	160 55	15 00	15 00	-	-	-	-	190 55
Sheep	-	751 91	55 00	-	-	-	-	806 91
Live stock	-	-	4 70	-	-	-	-	4 70
Swine	-	798 21	12 00	-	-	-	-	810 21
Field crops	-	-	-	-	\$2,067 83	-	-	2,067 83
Tools and machinery	-	-	-	-	-	\$12 50	-	12 50
Miscellaneous	-	-	-	\$173 04	-	-	\$166 00	339 04
Totals	\$10,175 33	\$2,734 08	\$405 18	\$173 04	\$2,067 83	\$12 50	\$166 00	\$15,733 96

AGRICULTURAL DIVISION.
Disbursements and Receipts.

	Disbursements.	Receipts.
Agronomy	\$1,230 72	\$355 97
Animal husbandry	671 28	215 50
Dairying	36,356 59	27,537 81
Farm	42,190 94	15,733 96
Farm management	532 58	88 00
Poultry husbandry	16,545 92	9,607 08
Rural engineering	932 85	215 95
Division totals	\$98,460 88	\$53,754 27

Summary.

	DR.	CR.
By total Division receipts		\$53,754 27
By bills receivable		5,536 49
By net apportionment		43,495 73
To total Division disbursements	\$98,460 88	
To bills payable	94 38	
By balance	4,231 23	
	\$102,786 49	\$102,786 49

Inventory of Quick Assets.

	Nov. 30, 1920.	Nov. 30, 1921.
Inventory of produce	\$13,663 93	\$10,487 81
Inventory of cattle	17,850 00	18,975 00
Inventory of swine	1,171 00	701 00
Inventory of horses	3,650 00	3,850 00
Inventory of poultry	2,467 50	3,390 00
Inventory of sheep	2,885 00	1,842 00
	\$41,687 43	\$39,245 81

HORTICULTURAL DIVISION.

Disbursements and Receipts.

	Disbursements.	Receipts.
Floriculture	\$8,143 79	\$4,680 41
Forestry	276 53	72 00
General horticulture	8,522 66	477 50
Grounds	8,306 21	2 75
Horticultural manufactures	3,324 25	697 45
Landscape gardening	474 47	389 00
Mount Toby	3,259 82	1,621 78
Pomology	4,910 95	2,635 57
Vegetable gardening	6,487 10	3,029 36
Division totals	\$43,705 78	\$13,605 82

Summary.

	DR.	CR.
By total Division receipts		\$13,605 82
By bills receivable		2,771 39
By net apportionment		33,469 18
To total Division disbursements	\$43,705 78	
To bills payable	40 73	
By balance	6,099 88	
	\$49,846 39	\$49,846 39

Inventory of Quick Assets.

	Nov. 30, 1920.	Nov. 30, 1921.
Floriculture	\$1,500 00	\$2,000 00
General horticulture (live stock)	1,855 00	1,285 00
Horticultural manufactures	150 00	150 00
Mount Toby	4,050 00	660 00
Pomology	1,350 00	1,400 00
Vegetable gardening	85 00	245 00
	\$8,990 00	\$5,740 00

EXPENSE OPERATING AND MAINTENANCE.

	Salaries and Labor.	Fuel and Water.	Repairs.	Equipment.	Miscellaneous.	Totals.
General:						
General superintendent	\$4,792 69	-	-	-	-	\$4,792 69
Office	1,242 40	-	-	-	\$221 05	1,463 45
Power plant:						
Heat	12,909 84	\$72,281 38	\$1,665 90	-	17 00	86,874 12
Light	7,651 32	-	684 71	-	-	8,336 03
Tools	-	-	-	\$1,150 68	-	1,150 68
Insurance	-	-	-	243 00	-	243 00
Amherst Water Company	-	-	-	-	-	2,810 28
Night watchman	1,967 36	2,810 28	-	-	-	1,967 36
Mail service	333 47	-	-	-	-	333 47
Water mains	935 09	-	-	-	-	935 09
Steam mains	6,883 55	-	-	-	-	6,883 55
Electric light circuit	1,258 52	-	-	-	-	1,258 52
Freight and express	-	-	-	-	-	1,739 48
Telephone	2,318 47	-	-	-	1,739 48	2,318 47
Truck	1,146 79	-	-	-	-	1,146 79
Miscellaneous sundry	47 40	-	-	-	252 58	299 98
Sewers and cesspools	210 76	-	-	-	-	210 76
Walks and drives	532 92	-	-	-	-	532 92
Emergency maintenance	1,129 02	-	228 78	-	71 97	1,429 77
Expert service:						
Architect	1,422 48	-	-	-	-	1,422 48
Engineer	89 00	-	-	-	-	89 00
Auditors	250 00	-	-	-	-	250 00
Fire department	-	-	-	-	61 59	61 59
Totals	\$45,121 08	\$75,091 66	\$2,579 39	\$1,150 68	\$2,606 67	\$126,549 48

EXPENSE OPERATING AND MAINTENANCE — *Continued.*

	Electric Repairs.	Plumbing Repairs.	Heat Repairs.	C. and M. Repairs.	Janitor.	Sundry.	Totals.
College buildings:							
Adams Hall	\$132 50	\$79 94	\$736 32	\$322 86	—	\$36 15	\$1,357 77
Animal husbandry building	50	8 56	4 13	12 81	—	—	26 00
Apiary building	3 49	5 01	3 00	6 89	—	—	18 39
Cavalry barn	8 75	15 74	—	883 39	—	—	907 88
Chemical building	1 33	141 41	53 24	132 03	—	—	328 01
Clark Hall	46 82	90 57	22 51	306 22	—	—	466 12
Cold-storage building	—	2 25	—	3 76	—	—	6 01
Dairy building	110 90	104 42	64 74	334 51	—	—	614 57
Dairy barn and storage	32 82	61 96	15 39	336 29	—	—	446 46
Draper Hall	336 45	884 53	323 07	2,476 91	—	—	4,533 62
Drill Hall	15 90	175 45	25 19	106 54	—	542 66	323 08
Durfee glass house (old)	—	23 97	3 30	58 80	—	—	86 07
Durfee glass house (new)	—	5 20	—	4 97	—	—	10 17
Experiment station, poultry	—	—	—	75 43	—	—	75 43
Fernald Hall	65	193 00	8 56	275 06	—	—	477 27
French Hall	148 51	15 60	8 02	190 05	—	—	362 18
Horse barn	—	11 17	—	355 85	—	—	367 02
Horticultural barn	4 65	55 46	50 29	78 12	—	—	188 52
Hospital	50	23 75	2 71	320 76	—	—	347 72
Mathematics building	—	4 40	—	11 99	—	—	16 39
Microbiology building	25 55	85 60	94 33	206 17	—	—	411 65
Memorial Hall	35 65	64 06	—	311 99	—	—	411 65
Physics building	16 79	52 29	10 16	2 74	—	—	81 98
Piggery	—	4 02	—	24 95	—	—	28 97
Poultry No. 1	24	106 89	9 60	26 33	—	—	143 06
Poultry No. 2	—	—	—	1 64	—	—	1 64
Poultry No. 3	—	14 90	94 52	12 45	—	—	121 87
Poultry No. 4	5 70	45 31	12 95	17 56	—	—	81 52
Poultry No. 5	—	14 82	—	—	—	—	14 82
Poultry No. 8	—	—	—	—	—	—	—
Power building	146 61	134 47	182 28	2 53	—	—	2 53
Rural engineering building	—	10 08	—	110 60	421 11	—	995 07
Sheep barn	—	69	—	113 29	—	—	123 37
Stockbridge Hall	432 53	98 51	47 68	50 15	—	—	50 84
Agromony greenhouse	1 30	—	2 08	246 13	—	—	824 85
Tool shed (farm)	—	—	—	—	—	—	3 38
				2 64	—	—	2 64

EXPERIMENT STATION.

Disbursements and Receipts.

	Disbursements from Dec. 1, 1920, to Nov. 30, 1921.	Receipts from Dec. 1, 1920, to Nov. 30, 1921.	Apportionment for Year ending Nov. 30, 1921.	Balance to Credit.
Administration	\$1,573 27	-	\$1,586 63	\$13 36
Agricultural	8,828 02	\$798 78	9,000 00	171 98
Agricultural economics	453 34	-	500 00	46 66
Botanical	2,205 51	-	2,150 00	-55 51
Chemical	4,208 81	1,490 48	3,500 00	-708 81
Cranberry	4,426 11	6,318 34	4,300 00	-126 11
Entomological	622 89	-	600 00	-22 89
Freight and express	205 21	-	300 00	94 79
Library	721 55	-	591 05	-130 50
Meteorology	637 92	-	600 00	-37 92
Microbiology	799 94	-	800 00	06
Pomology	3,103 26	858 24	3,150 00	46 74
Poultry	2,634 16	-	2,900 00	265 84
Publications	2,268 53	-	2,400 00	131 47
Salaries	69,711 01	-	71,684 84	1,973 83
Treasurer's office	358 47	-	400 00	41 53
Veterinary	833 02	-	700 00	-133 02
Hatch fund	-	15,000 00	-	-
Adams fund	-	15,000 00	-	-
State Treasurer, account of schedules	-	73,841 00	-	-
Income remitted to State Treasurer	9,465 84	-	-	-
	\$113,056 86	\$113,306 84	\$105,162 52	\$1,571 50
Balance beginning fiscal year Dec. 1, 1920.	-	2,862 52	-	-
Balance on hand Nov. 30, 1921	3,112 50	-	-	-
Totals	\$116,169 36	\$116,169 36	-	-

EXPERIMENT STATION — *Continued.*
Comparative Disbursements and Receipts, 1920-21.

ACCOUNTS.	DISBURSEMENTS.		RECEIPTS.	
	1920.	1921.	1920.	1921.
Administration	\$943 03	\$1,573 27	\$1 35	—
Agricultural	8,747 21	8,828 02	1,689 80	\$798 78
Agricultural economics	434 66	453 34	—	—
Botanical	2,046 51	2,205 51	—	—
Chemical	3,879 58	4,208 81	2,432 80	1,490 48
Cranberry	5,874 74	4,426 11	3,912 35	6,318 34
Entomological	514 56	622 89	—	—
Freight and express	197 52	205 21	—	—
Horticultural	2,329 82	—	16 20	—
Library	524 66	721 55	—	—
Meteorology	364 58	637 92	—	—
Microbiology	848 38	799 94	—	—
Pomology	—	3,103 26	—	858 24
Poultry	2,690 18	2,634 16	—	—
Publications	2,552 05	2,268 53	—	—
Salaries	60,444 48	69,711 01	—	—
Treasurer's office	359 41	358 47	—	—
Veterinary	532 04	833 02	—	—
Hatch fund	—	—	15,000 00	15,000 00
Adams fund	—	—	15,000 00	15,000 00
Transferred to general maintenance .	—	—	2,935 19	—
State Treasurer, account of schedules	—	—	60,364 07	73,841 00
Income remitted to State Treasurer .	8,044 81	9,465 84	—	—
	\$101,328 22	\$113,056 86	\$101,351 76	\$113,306 84
Less refunds	7 69	—	7 69	—
	\$101,320 53	\$113,056 86	\$101,344 07	\$113,306 84
Balance beginning of fiscal year .	—	—	2,838 98	2,862 52
Balance on hand at close of fiscal year	2,862 52	3,112 50	—	—
Totals	\$104,183 05	\$116,169 36	\$104,183 05	\$116,169 36

EXPERIMENT STATION — *Concluded.*
Analysis of Experiment Station Accounts.

	Adams Fund.	Hatch Fund.	State Fund.	Totals.
Salaries	\$14,487 08	\$14,336 68	\$40,887 25	\$69,711 01
Labor	512 82	97 50	15,584 41	16,194 73
Publications	—	—	1,666 02	1,666 02
Postage and stationery	—	—	2,213 34	2,213 34
Freight and express	—	—	250 48	250 48
Heat, light, water and power	—	—	500 88	500 88
Chemical and laboratory supplies	—	—	2,314 10	2,314 10
Seeds, plants and sundry supplies	98 88	—	2,244 43	2,343 31
Fertilizers	142 48	—	1,066 46	1,208 94
Feedstuffs	8 45	—	1,446 38	1,454 83
Library	—	—	816 20	816 20
Tools, machinery and appliances	—	—	688 49	688 49
Furniture and fixtures	—	—	617 52	617 52
Scientific apparatus and specimens	66 13	—	205 27	271 40
Live stock	—	—	286 94	286 94
Traveling expenses	—	—	2,252 50	2,252 50
Contingent expenses	—	—	5 00	5 00
Buildings and land	—	—	795 33	795 33
Totals	\$15,315 84	\$14,434 18	\$73,841 00	\$103,591 02

Summary.

	Disbursements.	Receipts.
Cash on hand Dec. 1, 1920	—	\$2,862 52
Receipts from State Treasurer	—	73,841 00
Receipts from United States Treasurer	—	30,000 00
Receipts from other sources	—	9,465 84
Total disbursements	\$103,591 02	—
Receipts turned in to State Treasurer	9,465 84	—
	\$113,056 86	\$116,169 36
Bills receivable Dec. 1, 1920, deducted	—	640 87
Bills payable Dec. 1, 1920, deducted	169 19	—
	\$112,887 67	\$115,528 49
Bills receivable Nov. 30, 1921	—	1,340 16
Bills payable Nov. 30, 1921	173 73	—
Balance	3,807 25	—
	\$116,868 65	\$116,868 65

EXTENSION SERVICE.¹
Disbursements and Receipts.

CLASSIFICATION.	Disbursements.	Receipts.	Apportionment.	Balance.
Administration	\$4,227 18	\$136 92	\$4,200 00	—\$27 18
Animal husbandry	994 00	—	900 00	—94 00
Co-operative marketing	1,058 09	—	1,500 00	441 91
Correspondence Courses	1,310 24	716 85	2,800 00	1,489 76
County agents' work	1,187 65	—	1,300 00	112 35
Clothing efficiency	424 62	—	—	—424 62
Dairying	235 72	—	250 00	14 28
Director's office	—	12 52	—	—
Entomology	11 26	—	100 00	88 74
Exhibits	1,009 98	25 20	1,500 00	490 02
Extension courses at College	1,384 74	—	1,150 00	—234 74
Extension schools	244 91	—	200 00	—44 91
Farm management demonstration	1,520 91	130 40	2,200 00	679 09
Forestry	—	—	125 00	125 00
Home demonstration agents	3,646 94	109 55	3,500 00	—146 94
Home economics specialists	1,312 76	—	—	—1,312 76
Home gardening	656 28	—	400 00	—256 28
Horticultural manufactures	1,503 18	—	1,500 00	—3 18
Junior Extension work	5,683 85	—	4,265 11	—1,418 74
Landscape extension	467 83	—	1,100 00	632 17
Lectures	49 10	—	50 00	90
Library extension	69 47	—	400 00	330 53
Local community organization	—	—	100 00	100 00
Methods of extension instruction	—	—	100 00	100 00
Nutrition and household management	364 40	—	—	—364 40
Plant diseases	—	—	100 00	100 00
Pomology	1,665 60	—	1,550 00	—115 60
Poultry husbandry	1,193 35	—	1,600 00	406 65
Printing	6,248 36	—	3,859 89	—2,388 47
Personal services	46,884 54	—	47,300 00	415 46
Rural engineering	122 58	—	150 00	27 42
Soils and crops	563 24	—	1,100 00	536 76
State Treasurer, account of schedules	—	84,024 10	—	—
Income to State Treasurer	1,131 44	—	—	—
	\$85,172 22	\$85,155 54	\$83,300 00	—\$740 78
Less refunds	16 68	—	—	—
	\$85,155 54	\$85,155 54	—	—

¹ Includes State Smith-Lever fund.

EXTENSION SERVICE — *Continued.**Summary.*

	Disbursements.	Receipts.
Balance Dec. 1, 1920 ¹	-	\$6,848 30
Receipts Nov. 30, 1921	-	1,131 44
Received from State Treasurer	-	84,024 10
Received from United States Treasurer	-	31,262 06
Disbursements to Nov. 30, 1921 ¹	\$118,127 71	-
Receipts turned in to State Treasurer	1,131 44	-
	\$119,259 15	\$123,265 90
Bills receivable Dec. 1, 1920, deducted	-	7 50
Bills payable Dec. 1, 1920, deducted	339 01	-
	\$118,920 14	\$123,258 40
Bills receivable Nov. 30, 1921	-	14 51
Bills payable Nov. 30, 1921	753 88	-
Balance	3,598 89	-
	\$123,272 91	\$123,272 91

¹ Includes Federal Smith-Lever fund.

EXTENSION SERVICE — *Concluded.*
Analysis of Extension Service Disbursements.

	Travel.	Equip- ment.	Supplies.	Postage, Sta- tionery and Small Printing.	Salaries and Labor.	Totals.
Administration	\$2,348 37	\$382 34	\$213 70	\$1,276 47	—\$57 30	\$4,163 58
Animal husbandry	928 28	1 40	—	80 14	95 65	1,105 47
Co-operative marketing	878 76	34 10	29 88	115 35	—	1,058 09
Correspondence Courses	85 86	—	43 50	1,175 13	637 04	1,941 53
County agents' work	844 05	20 76	22 26	300 58	104 23	1,291 88
Clothing efficiency	339 58	1 75	7 15	76 14	5 00	429 62
Dairying	226 94	—	—	8 78	223 33	459 05
Director's office	—	—	—	—	58 58	58 58
Entomology	11 26	—	—	—	—	11 26
Exhibits	318 36	38 58	265 66	370 80	133 23	1,126 63
Extension courses at College	328 69	25 35	355 16	674 04	631 07	2,014 31
Extension schools	55 62	—	60 00	135 89	16 08	267 59
Farm management demonstra- tion.	567 72	—	—	953 94	129 62	1,651 28
Home demonstration agents	2,145 06	65 79	242 47	1,338 24	205 76	3,997 32
Home economics specialists	1,269 77	—	8 39	34 60	210 00	1,522 76
Home gardening	237 16	—	136 18	282 94	70 85	727 13
Horticultural manufactures	1,183 01	26 73	142 26	151 18	18 90	1,522 08
Junior Extension work	3,274 25	97 09	149 45	2,157 58	115 15	5,793 52
Landscape extension	430 29	1 20	—	36 34	12 50	480 33
Lectures	49 10	—	—	—	—	49 10
Library extension	—	—	49 85	10 27	—	60 12
Local community organization	—	—	—	—	2 00	2 00
Nutrition and household man- agement.	284 75	—	14 22	65 43	—	364 40
Pomology	907 65	211 71	174 23	372 01	—	1,665 60
Poultry husbandry	1,096 48	6 60	8 20	82 83	—	1,194 11
Printing	92 72	84 35	38 33	5,909 37	293 43	6,418 20
Personal services	—	—	—	—	43,162 74	43,162 74
Rural engineering	97 91	—	—	24 67	7 00	129 58
Soils and crops	501 39	—	50 40	11 45	809 68	1,372 92
	\$18,503 03	\$997 75	\$2,011 29	\$15,644 17	\$46,884 54	\$84,040 78
Less refunds	—	—	—	16 68	—	16 68
Totals	\$18,503 03	\$997 75	\$2,011 29	\$15,627 49	\$46,884 54	\$84,024 10

SMITH-LEVER FUND (FEDERAL).

	Disbursements.	Receipts.
Administration	\$279 13	-
Animal husbandry	39 13	-
District and county agents	43 76	-
Home demonstration agents	253 10	-
Home economic specialists	21 11	-
Junior extension works	339 61	-
Nutrition and household management	69 05	-
Printing and publications	70 22	-
Salaries	32,988 50	-
State Treasurer	-	\$31,262 06
	\$34,103 61	\$31,262 06
Balance beginning fiscal year Dec. 1, 1920	-	6,848 30
Balance on hand Nov. 30, 1921	4,006 75	-
Totals	\$38,110 36	\$38,110 36

SHORT COURSES.

	Personal Services.	Office.	Laboratory Supplies.	Minor Equipment.	Travel.	Miscellaneous.	Printing.	Totals.
Two-Year Course	\$1,386 01	\$1,244 65	\$5,591 17	\$187 96	\$892 48	\$454 40	-	\$9,756 67
Ten Weeks' Winter School	1,402 16	176 61	250 07	-	175 00	96 40	-	2,100 24
Summer School	2,401 72	102 26	463 40	13 00	36 60	6 89	-	3,023 87
Printing	-	-	-	-	-	-	\$628 16	628 16
Personal services	37,569 81	-	-	-	-	-	-	37,569 81
	\$42,759 70	\$1,523 52	\$6,304 64	\$200 96	\$1,104 08	\$557 69	\$628 16	\$53,078 75

SUMMARY.

	Dr.	Cr.
State appropriation		\$54,350 00
Amount of receipts		4,921 85
Amount of receipts transferred to State Treasurer	\$4,921 85	
Department expenditures	53,078 75	
Balance unexpended	1,271 25	
Totals	\$59,271 85	\$59,271 85

MARKET-GARDENING FIELD STATION.

	Dr.	Cr.
Labor	\$5,689 49	
Maintenance	3,031 49	
Total	\$8,720 98	
State appropriation		\$9,072 13
Amount of receipts		3,071 14
Amount of receipts transferred to State Treasurer	\$3,071 14	
Department expenditures	8,720 98	
Balance unexpended	351 15	
Totals	\$12,143 27	\$12,143 27

SPECIAL APPROPRIATIONS.

	Date made.	Appropriation.	Amount expended to Date.	Unexpended Balance.
Women's dormitory	1919	\$127,400 00	\$127,400 00	—
Engineering study	1919	2,000 00	2,000 00	—
Stable for cavalry barn	1920	15,000 00	15,000 00	—
Improvements and equipment	1921	47,305 22	47,305 22	—
Administration building, Market-Garden Field Station.	1921	10,000 00	7,331 01	\$2,668 99
Chemistry building, architect's fees ¹	—	2,000 00	2,000 00	—
		\$203,705 22	\$201,036 23	\$2,668 99
Amount spent previous to Dec. 1, 1920	—	—	—	109,456 38
Amount expended during fiscal year	—	—	—	91,579 85
Unexpended balance Nov. 30, 1921	—	—	2,668 99	—
		\$203,705 22	\$203,705 22	\$203,705 22

¹ This payment was authorized by the Auditor's office of the Commonwealth, and is not a special appropriation.

INVENTORY — *Continued.**College Buildings (Estimated Value) 1921.*

	Inventory at Beginning of Year.	Per Cent de- ducted.	Value at Beginning of Year less De- terioration.	Repairs and Improve- ments during Year.	Total Value at Close of Fiscal Year.
Adams Hall	-	-	\$127,400 00	\$2,216 70	\$129,616 70
Animal husbandry building	\$9,061 06	2	8,879 84	26 00	8,905 84
Apiary	2,946 30	2	2,887 37	18 39	2,905 76
Cashier's house	1,552 57	5	1,474 94	35 86	1,510 80
Chemical laboratory	8,515 55	5	8,089 77	386 36	8,476 13
Clark Hall	62,059 90	2	60,818 70	557 37	61,376 07
Cold-storage laboratory	10,796 29	2	10,580 36	6 01	10,586 37
Dairy building	69,864 34	2	68,467 05	664 70	69,131 75
Dairy barn and storage	26,602 92	3	25,804 83	5,153 82	30,958 65
Draper Hall	67,073 52	3	65,061 31	3,990 96	69,052 27
Drill hall and gun shed	9,270 27	5	8,806 76	439 06	9,245 82
Durfee glass house (old)	7,782 83	5	7,393 69	86 07	7,479 76
Durfee glass house (new)	11,584 31	5	11,005 09	10 17	11,015 26
Farm bungalow	2,576 22	3	2,498 93	64 64	2,563 57
Farmhouse No. 1	2,851 84	3	2,766 28	156 22	2,922 50
Farmhouse No. 2	3,883 05	8	3,572 41	793 81	4,366 22
Fernald Hall	72,539 63	2	71,088 84	756 73	71,845 57
French Hall	45,744 80	2	44,829 90	994 37	45,824 27
Grounds tool shed	221 11	5	210 05	-	210 05
Harlow house	2,055 93	5	1,953 13	55 84	2,008 97
Horse barn	4,524 55	3	4,388 81	367 02	4,755 83
Head of Division of Horticulture, resi- dence.	2,174 87	5	2,066 13	121 79	2,187 92
Horticultural barn	3,627 92	3	3,519 08	188 52	3,707 60
Horticultural tool shed	1,665 95	3	1,615 97	-	1,615 97
Horticultural open shed	501 38	5	476 31	17 74	494 05
Horticultural manufactures shed	3,185 24	5	3,025 98	598 53	3,624 51
Hospital	14,560 90	2	14,269 68	347 72	14,617 40
Kellogg house and barn	3,243 92	5	3,081 72	71 96	3,153 68
Machinery barn	3,509 87	3	3,404 57	2 64	3,407 21
Market-Garden Field Station barn	3,194 36	3	3,098 53	-	3,098 53
Mathematical building	4,898 61	5	4,653 68	16 39	4,670 07
Microbiology building	57,891 13	2	56,733 31	411 65	57,144 96
Military storage	225 62	5	214 34	-	214 34
Mount Toby house and barn	3,619 19	5	3,438 23	48 09	3,486 32

INVENTORY — *Continued.**College Buildings (Estimated Value) 1921 — Concluded.*

	Inventory at Beginning of Year.	Per Cent de- ducted.	Value at Beginning of Year less De- terioration.	Repairs and Improve- ments during Year.	Total Value at Close of Fiscal Year.
North dormitory	\$25,186 21	2	\$24,682 49	\$2,233 88	\$26,916 37
Physics laboratory	4,579 99	5	4,350 99	81 98	4,432 97
Piggery	2,515 94	3	2,440 46	28 97	2,469 43
Poultry department:					
No. 1, demonstration building	1,365 56	2	1,338 25	143 06	1,481 31
No. 2, oil house	74 92	2	73 42	1 64	75 06
No. 3, brooder killing and fattening laboratory.	2,285 84	2	2,240 12	121 87	2,361 99
No. 4, mechanics, storage building and incubator cellar.	3,352 77	2	3,285 71	81 52	3,367 23
No. 5, laying house	1,704 59	2	1,650 50	14 82	1,665 32
No. 6, manure shed	90 98	2	89 16	-	89 16
No. 7, small henhouse	45 79	2	44 87	-	44 87
No. 8, breeding house	1,450 17	2	1,421 17	2 53	1,423 70
No. 9, experimental breeding house	568 78	2	557 40	-	557 40
No. 10, duck house	94 13	2	92 25	-	92 25
No. 11, unit house for 200 hens	476 21	2	466 69	-	466 69
No. 12, unit house for 100 hens	384 26	2	376 57	-	376 57
Power plant and storage building, in- cluding coal pocket.	48,020 63	2	47,060 22	995 07	48,055 29
President's house	13,074 51	3	12,682 27	312 25	12,994 52
Farm blacksmith shop	458 13	3	444 39	-	444 39
Rural engineering building	3,503 25	2	3,433 18	123 37	3,556 55
Sheep barn	1,371 18	3	1,330 04	50 84	1,380 88
South dormitory	38,571 04	2	37,799 62	1,498 60	39,298 22
Stable for cavalry unit	-	-	15,000 00	3,141 38	18,141 38
Stockbridge Hall	169,031 66	2	165,651 03	824 85	166,475 88
Agronomy greenhouse	1,959 98	2	1,920 78	3 38	1,924 16
Stockbridge house	1,569 89	5	1,491 40	78 92	1,570 32
Stone chapel	28,707 98	2	28,133 82	1,945 90	30,079 72
Turbine house	18,246 87	2	17,881 93	554 22	18,436 15
Vegetable plant house	4,258 14	5	4,045 23	115 22	4,160 45
Veterinary laboratory and stable	21,662 26	2	21,229 01	114 67	21,343 68
Waiting station	460 98	2	451 76	5 57	57 33
Wilder Hall	33,723 32	2	33,048 85	122 30	33,171 15
Young stock barns	5,735 56	3	5,563 49	71 62	5,635 11
Totals	\$958,337 47	-	\$1,077,852 66	\$31,273 56	\$1,109,106 22

INVENTORY — *Continued.**College Equipment (Estimated Value).*

Administrative division:

Dean's office	\$600 80
President's office	2,699 50
Registrar's office	1,204 22
Treasurer's office	4,116 39

Agricultural division:

Agronomy	8,565 33
Animal husbandry	935 48
Dairy	24,377 65
Farm	44,159 81
Farm management	1,242 05
General agriculture	2,638 95
Poultry	10,184 52
Rural engineering	6,733 83

Domestic science	3,289 54
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Dining hall	25,661 66
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Extension	12,706 37
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General science:

Apiary	2,362 11
Botanical	23,985 65
Chemical	18,743 61
Entomology	5,117 97
Mathematics	2,263 00
Microbiology	6,326 25
Physics	6,836 39
Veterinary	10,176 16
Zoölogical and geological	17,240 79

Graduate School	74 70
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Horticultural division:

Floriculture	32,437 83
Forestry	2,618 23
General horticulture	7,047 00
Grounds	2,152 45
Horticultural manufactures	5,095 55
Landscape gardening	5,566 22
Market-Garden Field Station	1,937 23
Mount Toby Reservation	3,655 36
Pomology	9,164 26
Vegetable gardening	3,717 17

Hospital	1,003 00
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Humanities division:

Economics and sociology	150 72
Language and literature	646 50

Library	121,121 99
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Military	1,395 84
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Operating and maintenance:

College supply	1,270 26
Fire apparatus	1,902 45

General maintenance:

Office	871 35
Carpentry and masonry supplies	5,488 20
Electrical supplies	4,296 58

INVENTORY — *Continued.**College Equipment (Estimated Value) — Concluded.*Operating and maintenance — *Con.*General maintenance — *Con.*

Equipment	\$82,396 77
Heating and plumbing supplies	10,354 70
Power plant supplies	537 18
Painting supplies	984 94
Steam main	56,159 38
Lighting lines	9,066 74
Janitor's supplies	1,185 87
Sewer line	14,063 19
Water mains	13,445 74
Physical education	1,859 71
Rural social science:	
Agricultural economics	1,907 57
Agricultural education	1,458 53
Rural sociology	312 50
Rural social science	68 00
Short course	1,506 98
Textbooks	2,741 75
Trophy room	1,200 00
Women's dormitory	9,331 00
Total	\$662,361 47

Experiment Station Buildings (Estimated Value).

	Inventory at Beginning of Year.	Per Cent.	Cost at Beginning of Year, less Per Cent De- terioration.	Repairs and Improve- ments during Year.	Total Value at Close of Year.
Agricultural laboratory	\$14,264 10	2	\$13,978 82	\$784 90	\$14,763 72
Agricultural barn	4,329 90	3	4,200 00	2 20	4,202 20
Agricultural farmhouse	1,481 70	3	1,437 25	167 34	1,604 59
Agricultural glass house	367 55	5	349 17	-	349 17
Cranberry buildings	3,242 31	5	3,080 19	-	3,080 19
Plant and animal chemistry laboratory	27,621 23	2	27,068 81	562 05	27,630 86
Plant and animal chemistry barns	4,116 62	3	3,993 12	588 52	4,581 64
Plant and animal chemistry dairy	1,665 95	3	1,615 97	-	1,615 97
Six poultry houses	551 28	2	540 25	75 43	615 68
Entomological glass houses	682 33	5	648 21	-	648 21
Tillson house	545 45	5	518 18	9 70	527 88
Tillson barn	1,028 85	5	977 41	-	977 41
Totals	\$59,897 27	-	\$58,407 38	\$2,190 14	\$60,597 52

INVENTORY — *Concluded.**Experiment Station Equipment (Estimated Value).*

Apiary	\$155 76
Agricultural Economics Department	204 62
Agricultural laboratory	7,175 75
Botanical laboratory	6,803 58
Chemical laboratory	27,086 34
Cranberry Station	3,793 78
Director's office	5,221 82
Entomological laboratory	23,795 55
Meteorological laboratory	619 00
Microbiological laboratory	2,847 15
Pomology	4,708 67
Poultry Department	5,891 58
Treasurer's office	1,018 00
Veterinary	238 20
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Total	\$89,559 80

Summary.

Land	\$132,238 08
College buildings	1,109,106 22
College equipment	662,361 47
Experiment Station buildings	60,597 52
Experiment Station equipment	89,559 80
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Total	\$2,053,863 09

	Acres.
College estate (area)	642.79
Cranberry Station, Wareham (area)	23.67
Market-Garden Field Station, Lexington (area)	12.00
Mount Toby demonstration forest (area)	755.27
Rifle range	46.20
Pelham quarry50
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Total acreage	1,480.43

STUDENTS' TRUST FUND ACCOUNT.

	Disburse- ments, Year ending Nov. 30, 1921.	Receipts, Year ending Nov. 30, 1921.	Balance on Hand.	Balance brought for- ward Dec. 1, 1920.
Athletics	\$21,317 13	\$21,382 34	—\$2,264 71	—\$2,329 92
Dining hall	97,906 67	106,333 54	—936 93	—9,363 80
Keys	106 00	111 50	81 00	75 50
Students' deposits	58,661 05	60,351 28	15,817 17	14,126 94
Social Union	1,660 57	1,864 39	800 56	596 74
Textbooks	11,755 93	13,092 81	2,156 96	820 08
Athletic field	54 74	—	169 70	224 44
Uniforms	263 70	3,653 76	3,517 62	127 56
Cow testing	20,285 18	21,442 78	1,516 60	359 00
Totals	\$212,010 97	\$228,232 40	\$20,857 97	\$4,636 54
Balance beginning fiscal year	—	4,636 54	—	—
Balance on hand Nov. 30, 1921	20,857 97	—	—	—
Totals	\$232,868 94	\$232,868 94	—	—

CONDENSED OPERATING STATEMENT OF THE DINING HALL.

	Operating Charges.	Income.
1920.		
Dec. 1, balance	—\$9,363 80	—
1921.		
Nov. 30, Total disbursements	97,906 67	—
Outstanding bills	1,173 53	—
Total collections	—	\$106,333 54
Accounts outstanding	—	721 28
Inventory	—	10,875 76
Balance	9,486 58	—
Totals	\$117,930 58	\$117,930 58

ENDOWMENT FUND.¹

	Principal.	Income.
United States grant (5 per cent)	\$219,000 00	\$7,300 00
Commonwealth grant (3½ per cent)	142,000 00	3,313 32
Total	—	\$10,613 32

¹ This fund is in the hands of the State Treasurer, and the Massachusetts Agricultural College received two-thirds of the income from the same.

BURNHAM EMERGENCY FUND.

	Market Value Dec. 1, 1921.	Par Value.	Income.
Two bonds American Telephone and Telegraph Company 4s, at \$880	\$1,760 00	\$2,000 00	\$80 00
Two bonds Western Electric Company 5s, at \$990	1,980 00	2,000 00	100 00
One United States Liberty Bond 4½s	485 00	500 00	21 25
Louisville Gas and Electric Company 7s	500 00	500 00	—
	\$4,725 00	\$5,000 00	\$201 25
Puget Sound Traction Light and Power Company	—	—	35 00
Earnings from exchange of bonds	—	—	14 22
Unexpended balance Dec. 1, 1920	—	—	297 46
	—	—	\$547 93
Disbursements for fiscal year ending Nov. 30, 1921	—	—	222 12
Cash on hand Nov. 30, 1921	—	—	\$325 81

LIBRARY FUND.

Five bonds New York Central & Hudson River Railroad Company 4s, at \$860	\$4,300 00	\$5,000 00	\$200 00
Five bonds Lake Shore & Michigan Southern Railroad Company 4s, at \$900	4,500 00	5,000 00	200 00
Two shares New York Central & Hudson River Railroad Company stock, at \$75	150 00	200 00	10 00
Amherst Savings Bank, deposit	167 77	167 77	8 44
	\$9,117 77	\$10,367 77	\$418 44
Disbursements for fiscal year Nov. 30, 1921	—	—	418 44

SPECIAL FUNDS.

Endowed Labor Fund (the Gift of a Friend of the College).

Two bonds American Telephone and Telegraph Company 4s, at \$880	\$1,760 00	\$2,000 00	\$80 00
Two bonds Lake Shore & Michigan Southern Railroad Company 4s, at \$900	1,800 00	2,000 00	80 00
One bond New York Central Railroad debenture 4s	860 00	1,000 00	40 00
One bond Louisville Gas and Electric 7s	1,000 00	1,000 00	70 00
Amherst Savings Bank, deposit	143 39	143 39	7 22
One United States Liberty Bond 4½s	970 00	1,000 00	42 50
	\$6,533 39	\$7,143 39	\$319 72
Unexpended balance Dec. 1, 1920	—	—	713 47
	—	—	\$1,033 19
Disbursements for fiscal year ending Nov. 30, 1921	—	—	1,022 23
Cash on hand Nov. 30, 1921	—	—	\$10 96

Whiting Street Scholarship Fund.

One bond New York Central debenture 4s	\$860 00	\$1,000 00	\$40 00
Amherst Savings Bank, deposit	271 64	271 64	13 72
	\$1,151 64	\$1,271 64	\$53 72
Unexpended balance Dec. 1, 1920	—	—	448 91
Cash on hand Nov. 30, 1921	—	—	\$502 63

SPECIAL FUNDS — *Continued.**Hills Fund.*

	Market Value Dec. 1, 1921.	Par Value.	Income.
Two United States Liberty Bonds 4½s, at \$970	\$1,940 00	\$2,000 00	\$85 00
One bond American Telephone and Telegraph Company 4s, at	880 00	1,000 00	40 00
One bond New York Central & Hudson River Railroad debenture 4s, at	860 00	1,000 00	40 00
One bond New York Central Railroad debenture 4s, at	860 00	1,000 00	40 00
Three bonds Pacific Telephone and Telegraph Company 5s, at \$910	2,730 00	3,000 00	150 00
One bond Western Electric Company 5s, at	990 00	1,000 00	50 00
Boston & Albany Railroad stock, 3½ bonds, at \$130	471 00	362 00	31 68
Amherst Savings Bank, deposit	72 75	72 75	3 65
Electric Securities Company bonds, 1½ bonds, at \$900	1,062 00	1,180 00	58 00
Two bonds Louisville Gas and Electric 7s, at \$1,000	2,000 00	2,000 00	140 00
	\$11,865 75	\$12,614 75	\$639 33
Unexpended balance Dec. 1, 1920	—	—	1,341 90
	—	—	\$1,981 23
Disbursements for fiscal year ending Nov. 30, 1921	—	—	299 76
	—	—	\$1,681 47
Cash on hand Nov. 30, 1921	—	—	

Mary Robinson Fund.

Amherst Savings Bank, deposit	\$142 00	\$142 00	\$7 17
Boston & Albany Railroad stock, ¾ share, at \$130	49 00	38 00	3 32
Electric Securities Company bonds, 4½ bonds, at \$900	738 00	820 00	41 00
	\$929 00	\$1,000 00	\$51 49
Unexpended balance Dec. 1, 1920	—	—	341 99
	—	—	\$393 48
Cash on hand Nov. 30, 1921	—	—	

Grinnell Prize Fund.

Ten shares New York Central & Hudson River Railroad stock, at \$75	\$750 00	\$1,000 00	\$50 00
Unexpended balance Dec. 1, 1920	—	—	245 74
	\$750 00	\$1,000 00	\$295 74
Disbursements for prizes	—	—	50 00
	—	—	\$245 74
Cash on hand Nov. 30, 1921	—	—	

Gassett Scholarship Fund.

One bond New York Central & Hudson River Railroad debenture 4s, at	\$860 00	\$1,000 00	\$40 00
Amherst Savings Bank, deposit	11 64	11 64	54
	\$871 64	\$1,011 64	\$40 54
Unexpended balance Dec. 1, 1920	—	—	344 73
	—	—	\$385 27
Cash on hand Nov. 30, 1921	—	—	

SPECIAL FUNDS — *Continued.**Massachusetts Agricultural College (Investment).*

	Market Value Dec. 1, 1921.	Par Value.	Income.
One share New York Central & Hudson River Railroad stock	\$75 00	\$100 00	\$5 00
Unexpended balance Dec. 1, 1920	—	—	100 45
Cash on hand Nov. 30, 1921	—	—	\$105 45

Danforth Keyes Bangs Fund.

Two bonds Pacific Telephone and Telegraph Company 5s, at \$910	\$1,820 00	\$2,000 00	\$100 00
Two bonds Union Electric Light and Power Company 5s, at \$900	1,800 00	2,000 00	100 00
Two bonds American Telephone and Telegraph Company 4s, at \$880	1,760 00	2,000 00	80 00
One United States Liberty Bond, 4½s	970 00	1,000 00	42 50
Interest from student loans	—	—	109 44
	\$6,350 00	\$7,000 00	\$431 94
Unexpended balance Dec. 1, 1920	—	—	408 12
Total loans made to students during fiscal year \$2,052 00	—	—	\$840 06
Cash received on account of students' loans . 2,587 16	—	—	
Excess of cash received over loans made	—	—	535 16
Cash on hand Nov. 30, 1921	—	—	\$1,375 22

John C. Cutter Fund.

One bond Pacific Telephone and Telegraph Company 5s, at	\$910 00	\$1,000 00	\$50 00
Unexpended balance Dec. 1, 1920	—	—	129 79
	\$910 00	\$1,000 00	\$179 79
Disbursements for fiscal year ending Nov. 30, 1921 . .	—	—	75 67
Cash on hand Nov. 30, 1921	—	—	\$104 12

William R. Sessions Fund.

One \$500 bond New York Central & Hudson River Rail- road 6s	\$500 00	\$500 00	\$30 00
Three United States Liberty Bonds, two at \$1,000 and one at \$500, 4½s, at \$970	2,425 00	2,500 00	106 25
One bond Toledo Light and Power Company 7s	1,000 00	1,000 00	70 00
One bond Conemaugh Light and Power Company 8s	1,050 00	1,000 00	80 00
	\$4,975 00	\$5,000 00	\$286 25
United Electric Light Company	—	—	30 00
Unexpended balance Dec. 1, 1920	—	—	128 99
	—	—	\$445 24
Disbursements for fiscal year ending Nov. 30, 1921 . .	—	—	403 85
Cash on hand Nov. 30, 1921	—	—	\$41 39

SPECIAL FUNDS — *Concluded.*
Alvord Dairy Scholarship Fund.

	Market Value Dec. 1, 1921.	Par Value.	Income.
One United States Liberty Bond 4½s	\$970 00	\$1,000 00	\$42 50
One bond Toledo Light and Power Company 7s	1,000 00	1,000 00	70 00
Two bonds Conemaugh Light and Power Company 8s, at \$1,050	2,100 00	2,000 00	160 00
	\$4,070 00	\$4,000 00	\$272 50
United Electric Light Company	—	—	60 00
Unexpended balance Dec. 1, 1920	—	—	453 22
	—	—	\$785 72
Disbursements for fiscal year ending Nov. 30, 1921	—	—	17 11
	—	—	\$768 61
Cash on hand Nov. 30, 1921	—	—	

SUMMARY OF BALANCES ON HAND OF THE INCOME FROM FUNDS HELD IN
 TRUST BY THE MASSACHUSETTS AGRICULTURAL COLLEGE.

Burnham emergency fund	\$325 81
Endowed labor fund	10 96
Whiting Street scholarship fund	502 63
Hills fund	1,681 47
Mary Robinson fund	393 48
Grinnell prize fund	245 74
Gassett scholarship fund	385 27
Massachusetts Agricultural College investment fund	105 45
Danforth Keyes Bangs fund	1,375 22
John C. Cutter fund	104 12
William R. Sessions fund	41 39
Alvord dairy scholarship fund	768 61
Total	\$5,940 15

I hereby certify that I have this day examined the Massachusetts Agricultural College account, as reported by the treasurer, Fred C. Kenney, for the year ending Nov. 30, 1921. All bonds and investments are as represented in the treasurer's report. All disbursements are properly vouched for, and all cash balances are found to be correct.

CHARLES A. GLEASON,
Auditor.

HISTORY OF SPECIAL FUNDS.

Burnham emergency fund:

A bequest of \$5,000 from T. O. H. P. Burnham of Boston made without any conditions. The trustees of the College directed that \$1,000 of this fund should be used in the purchase of the Newell land and Goessmann Library.

The fund now shows an investment of \$4,000 00

Library fund:

The library of the College at the present time contains 67,-445 volumes. The income from the fund raised by the alumni and others is devoted to its increase, and additions are made from time to time as the needs of the different departments require. Dec. 27, 1883, William Knowlton gave \$2,000; Jan. 1, 1894, Charles L. Flint gave \$1,000; in 1887, Elizur Smith of Lee, Mass., gave \$1,315. These were the largest bequests and now amount to

10,000 00

Endowed labor fund:

Gift of a friend of the College in 1901, income of which is to be used for the assistance of needy and deserving students

5,000 00

Whiting Street scholarship fund:

Gift of Whiting Street of Northampton, for no special purpose, but to be invested and the income used. This fund is now used exclusively for scholarship

1,000 00

Hills fund:

Gift of Leonard M. and Henry F. Hills of Amherst, Mass., in 1867, to establish and maintain a botanic garden

10,000 00

Mary Robinson fund:

Gift of Miss Mary Robinson of Medfield, in 1874, for scholarship

1,000 00

Grinnell prize fund:

Gift of Hon. Wm. Claflin, to be known as the Grinnell agricultural prize, to be given to the two members of the graduating class who may pass the best oral and written examination in theory and practice of agriculture, given in honor of George B. Grinnell of New York

1,000 00

Gassett scholarship fund:

Gift of Henry Gassett of Boston, the income to be used for scholarship

1,000 00

Massachusetts Agricultural College investment fund:

Investment made by vote of trustees in 1893 to purchase one share of New York Central & Hudson River Railroad stock. The income from this fund has been allowed to accumulate

100 00

Danforth Keyes Bangs fund:

Gift of Louisa A. Baker of Amherst, Mass., April 14, 1909, the income thereof to be used annually in aiding poor, industrious, and deserving students to obtain an education in said college \$6,000 00

John C. Cutter fund:

Gift of Dr. John C. Cutter of Worcester, Mass., an alumnus of the College, who died in August, 1909, to be invested by the trustees, and the income to be annually used for the purchase of books on hygiene 1,000 00

Alvord dairy scholarship fund:

Gift of Henry E. Alvord, who was the first instructor in military tactics, 1869-71, and a professor of agriculture 1885-87, at this institution. The income of this fund is to be applied to the support of any worthy student of said College, graduate or postgraduate, who may be making a specialty of the study of dairy husbandry (broadly considered) with the intention of becoming an investigator, teacher, or special practitioner in connection with the dairy industry, provided that no benefits arising from such fund shall at any time be applied to any person who then uses tobacco in any form, or fermented or spirituous beverages, or is known to have done so within one year next preceding 4,000 00

William R. Sessions fund:

In accordance with the request of my deceased wife, Clara Markham Sessions, made in her last will, I bequeath to the trustees of the Massachusetts Agricultural College, Amherst, Mass., the sum of \$5,000, it being the amount received by me from the estate of the said Clara Markham Sessions. The said \$5,000 to be kept by the said trustees a perpetual fund, the income from which shall be for the use of the Massachusetts Agricultural College; and according to the further request of my deceased wife, made in her last will, this is to be known as the William R. Sessions fund, and is to be a memorial of William R. Sessions; and it is my special request that the said trustees shall make record of the fact that this fund came from the estate of my deceased wife, Clara Markham Sessions, in accordance with her request made in her last will 5,000 00

\$49,100 00

FRED C. KENNEY,
Treasurer.

THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF EDUCATION

**The Massachusetts Agricultural
College**

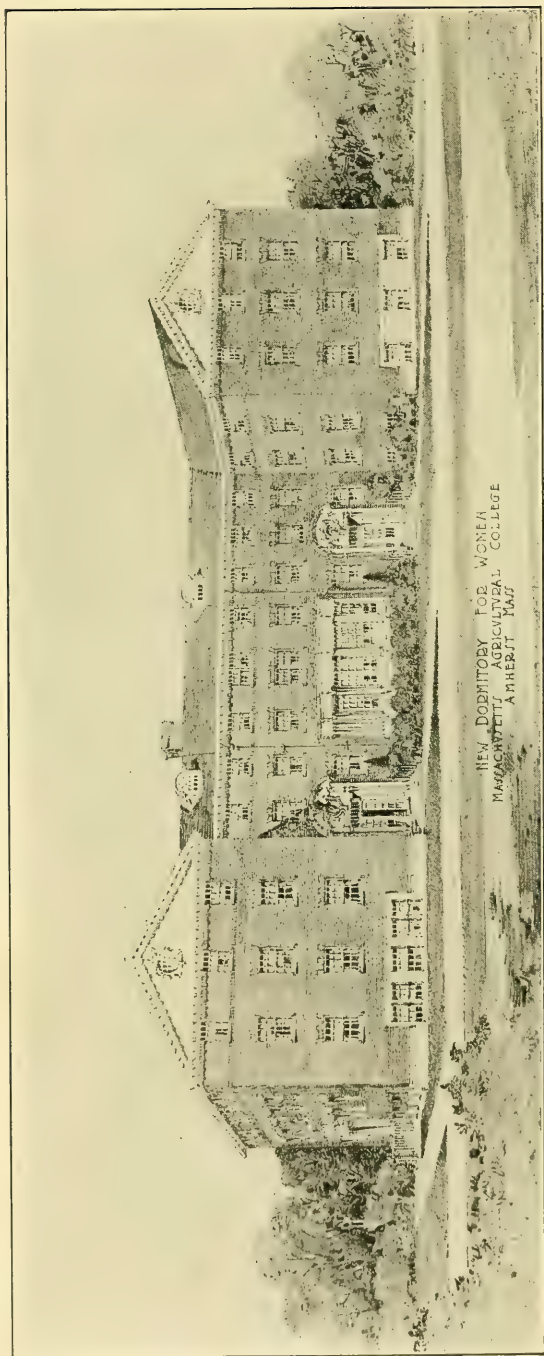
SHORT COURSES

SUMMER SCHOOL

1922



AMHERST, MASS.



The Abigail Adams House

The Abigail Adams House, the new dormitory for women students, will be placed at the disposal of women students of the Summer School. This is a new building, conveniently located for all College activities and a natural center for social life on the campus. It will afford a very pleasant and attractive home for ninety-eight Summer School students. There are thirty double and thirty-eight single rooms.

The Commonwealth of Massachusetts

DEPARTMENT OF EDUCATION

THE M. A. C. BULLETIN

Amherst, Mass.

Volume XIV

MAY, 1922

Number 4

SUMMER SCHOOL

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SUPERVISOR OF ADMINISTRATION.

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JOHN PHELAN, A.M.

Director of Short Courses

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Secretary of the College

FRED C. KENNEY

Treasurer of the College

HENRY S. GREEN, A.B., LL.D.

Librarian of the College

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Assistant Professor of Poultry Husbandry

VIOLET BOLINGBROKE Millinery

Instructor in Home Economics

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Instructor in Home Economics

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Professor of Vegetable Gardening

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Assistant Professor of Pomology

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Instructor in Home Economics

CORINNE HALL, A.B. Foods

Instructor in Home Economics

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<i>Assistant Professor of Beekeeping</i>	
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<i>Director of Practical Arts, State Normal School, Framingham, Mass.</i>	
CLARK L. THAYER, B.Sc.	Floriculture
<i>Professor of Floriculture</i>	
WINTHROP S. WELLES, B.Sc.	Agricultural Education
<i>Professor of Agricultural Education</i>	
— — — — —	Insect Life

SUMMER SCHOOL

ANNOUNCEMENT

Date of Opening. — The fifteenth session of the Massachusetts Agricultural College Summer School will open on Monday, July 10, and close on Friday, August 5.

Courses. — The courses offered in the Summer School are based on the experience of previous years in meeting the needs of the summer student body. Especial attention is given to the organization of these courses that they may be intensive and practical. Twenty exercises are held in each subject. Instruction is given by the regular members of the College staff assisted by outside lecturers.

Courses in the Summer School are arranged for the convenience of the students, so that there may be the greatest latitude in the election of studies. The following groups have been so scheduled that subjects in each group may be elected by the student: —

GROUP 1. — Courses for teachers, teachers of home economics and home-makers: —

Foods and Nutrition.	House Furnishing.
Preparation and Serving of Meals.	Millinery.
Garment Making.	Home Management.
Dress Design and Construction.	

GROUP 2. — It has been found that there are many students who seek a general knowledge of theoretical and practical agriculture who can come to the College conveniently during the summer session. The following courses will be of interest to men and women engaged in commercial farming on a small scale: —

Group A

Poultry.
 Fruit Growing.
 Beekeeping.
 Food Preservation.

Group B

Fruit Growing.
 Insect Pests.
 Vegetable Gardening.
 Food Preservation.

Group C

Flower Growing.
 Insect Pests.
 Beekeeping.
 Poultry.

GROUP 3. — Four weeks may be spent with great profit at Amherst by city or country boys or girls interested in farming. Those seventeen years of age or over will be admitted without examination. For these, courses listed as Group A are recommended.

GROUP 4. — The Summer School was originally designed for public school teachers, and each year a considerable number of teachers have attended. The following courses are suggested as of particular interest to this class of students: —

Dramatic Presentation.
 Bird Life.

Sanitation and Hygiene.
 Design and Practical Arts.

GROUP 5. — Teachers of agricultural education: —

Principles and Methods of Teaching.
 Special Methods in Vocational Agricultural Teaching.
 Professional Improvement Problems.
 Supervision and Administration of Agricultural Education.
 Vocational Education.
 Graduate Seminar in Agricultural Education.

Entrance Conditions. — The courses offered in the Summer School are open to all students seventeen years of age or over who can do and profit by the work elected.

Registration. — The registration of students will be in the Social Union Room from 9 A.M. until 5 P.M., Monday, July 10. No one will be allowed to register for full-time work after Monday, July 17. Classes and laboratory work will begin Tuesday, July 11.

Certificate. — Students who complete at least three courses, fifteen hours, in a satisfactory manner, and who have practically a perfect attendance, will be granted a certificate at the close of the term.

Election of Courses. — Election of courses should be made at the time of registration. All courses elected must be carried by the student in a manner satisfactory to the instructor. Regular attendance will be required in each course, and every election is subject to the approval of the director and the instructor whose course is elected. Students may elect not less than ten nor more than twenty exercises per week, unless special permission is given by the Director of Short Courses.

Board and Room. — Rooms will be provided for students in the College dormitory and in private homes near the College grounds. The new women's dormitory will be available for women students. There are thirty double and thirty-eight single rooms. A uniform rate of \$3 per week will be charged each student. Each one will be expected to supply her own blankets, sheets, pillow cases, etc. Convenient arrangements for laundry work may be made in Amherst.

All requests for dormitory rooms must be made to the Treasurer of the College. A deposit of \$2 is required in order to secure a reservation in the dormitory. Students will be notified by the Treasurer, upon receipt of the fees, as to the location of the room. In case any change is desired, the request should be made immediately. Deposits will not be refunded after the beginning of the summer session. The deposit is applied to the payment for the room. Rooms outside the College vary considerably in their accommodations and somewhat in price, the charge ranging from \$2.50 to \$4 a week for each

person. A list of rooms available in the village will be furnished to Summer School students at the time of registration. Every effort will be made by those in charge to see that every one has comfortable accommodations. A few furnished houses at reasonable rentals are usually available in Amherst during July and August.

The College will maintain a cafeteria on the self-service plan in Draper Hall, on the College grounds. Board may be had at from \$6 to \$8 per week. Good boarding places can also be secured outside of the College if desired.

Tuition, Fees, and Expenses. — Tuition is free for the summer session. There are no laboratory or incidental fees in connection with any course.

Rules and Regulations. — As a guide to those who come to the College for the first time, the following extracts are taken from the regular rules of the College: —

The customary high standard of college men and women in honor, manliness, self-respect, and consideration for the rights of others constitutes the standard of student deportment.

It should be understood that the College, acting through its President or any administrative officer designated by him, distinctly reserves the right not only to suspend but also to name conditions under which students may remain in the institution.

It is the custom of the College that all parties, gatherings, and other social events should first have the approval of some recognized College authority.

The College. — The College campus occupies an attractive site three-quarters of a mile north of Amherst center. It is connected with the town and the railway station by electric car service. The College has over 700 acres of land, most of which is in a high state of cultivation, and illustrates most of the leading agricultural industries of Massachusetts. There is a large range of greenhouses of the most modern and approved type; there is a modern dairy barn

with dairy cattle; there are good horses, pure-bred swine, sheep, and poultry; there are fields of corn, potatoes, clover, and grass in season; orchards of apple, peach, plum, and pear trees; tracts of good forest land, nurseries, and market gardens. There are also considerable tracts devoted to experiments, many of which are of unusual interest. Then there are well-equipped departments of botany, entomology, and chemistry, dealing in the most thorough manner with these special sciences. The advantages of the plant equipment and teaching staff are made available to Summer School students.

The Library. — The College library occupies the entire lower floor and basement of the Chapel-Library building. It contains more than 65,000 volumes in addition to a large number of unbound periodicals and pamphlets. Works on agriculture, horticulture, botany, entomology, and the various sciences predominate, but literature, history, economics, and sociology are well represented and receive due attention. In addition to a few newspapers and the best farm papers, the reading room is supplied with a good variety of popular periodical literature, encyclopedias, and general reference books. The equipment is such that the library ranks extremely well with the agricultural libraries of the country.

Summer School students should be able to find excellent material for their line of College work, and are cordially invited to make use of the library and its equipment. The librarian and library assistants are always on hand, ready and willing to be of assistance.

The library hours are from 8 A.M. to 12 M., and 1 P.M. to 5 P.M. every week day.

AGRICULTURE AND HORTICULTURE

Poultry Husbandry. — This course includes a study of breeds and varieties, according to their standard and utility classification; incubation and brooding; housing; feeds and feeding; marketing eggs and poultry; and management of the flock. The laboratory exercises consist entirely of practical work. This includes a careful study of all the characters involved in selecting hens for high and low egg production; killing and dry picking, drawing, trussing, dis-jointing, and caponizing; a comparative study of scratch feed mashers, dairy, and slaughterhouse by-products. Four lectures and one laboratory period a week; four weeks.

Professor Banta

Fruit Growing. — A study of modern methods of propagating, planting, cultivating, pruning, fertilizing, and spraying fruit trees; planning and managing orchards; selling fruit. Lectures, demonstrations, and field exercises. Five exercises a week; four weeks.

Assistant Professor French

Flower Growing. A. GARDEN FLOWERS. — This part of the course aims to familiarize the student with the methods of propagation and culture, use and value of the most important plants used in flower gardens, including annuals, biennials, perennials, bedding plants, bulbs, and roses. Soils and fertilizers, as applied to flower gardening, will be considered. The Department of Floriculture has a large garden devoted to the culture of annuals and perennials which provides material for study.

B. INDOOR FLOWER GROWING. — This work is intended for those who wish to grow plants indoors without the use of a greenhouse.

It will include a discussion of soils, fertilizers, and containers; methods of propagation and culture of plants suitable for use in the schoolroom or in the home. The filling and care of baskets, window and porch boxes will be considered. Five lectures and one two-hour laboratory period a week; four weeks.

Professor Thayer

Vegetable Gardening. — This course will consider the principles underlying the successful culture of vegetables in the home, school, community, or factory garden. It will include a study of the preparation of the land, fertilizers and manures, seeds and seeding, the growing of plants in hotbeds and cold frames, planning and planting the garden, garden tools, the harvesting and storing of the garden products. Application of the principles studied in the classroom will be made in practical exercises in the students' gardens and with the large variety of crops grown on the 10 acres of land operated by the Vegetable Gardening Department. Three classroom periods and two two-hour laboratory periods a week; four weeks.

Professor Dacy

Food Preservation I. — This course aims to place before the student the latest and best methods in canning, evaporating, and the making of fruit and vegetable products, together with a study of the most approved types of equipment.

Fruits and vegetables will be canned in both tin and glass, using the hot-water bath, the water-seal canners, steam-pressure canners, and steam pasteurizer. Special attention will be given to the preservation of fruits and fruit juices for culinary purposes. Both home and commercial types of evaporators will be used for evaporating such fruits and vegetables as are available.

The manufacture of various fruit products, such as jams, jellies, preserves, butters, pastes, and leathers will occupy about one-half the course. The home manufacture of vinegar, sauerkraut, hominy, and other commonly used products will be studied if time permits.

Special attention will be given to the utilization of the surplus and cheap grades of fruits and vegetables so frequently a source of loss to the grower.

The course is planned primarily for the housewife and the teacher, but much of the work may be adapted to the community center of the small home factory. This course is a practical one, in that all theories and principles discussed in lectures will be applied by the student in the laboratory work.

Two lectures and three two-hour laboratory periods per week; four weeks. Class limited to fifteen students.

Professor Chenoweth

Food Preservation II. — This course is offered for those who cannot devote the full four weeks to this type of work. Either the canning and drying or the manufacturing of fruit and vegetable products as outlined above will be studied, as the class may elect. Two lectures and three two-hour laboratory periods; last two weeks. Class limited to fifteen students.

Professor Chenoweth

Beekeeping. — This course comprises a general consideration of the biology of the honey bee and the elements of practical beekeeping. Some topics covered are: life history, general behavior and instincts, structure, products, relations of bees to plants, the honey flora. The course aims particularly to afford first-hand practical experience with bees, to the end of enabling their proper maintenance for any purpose, — horticultural, educational, or agricultural. Bee diseases, a thorough understanding of which is fundamental, are emphasized. So far as possible, the work is made individual in constructing materials and apparatus, and in the manipulation of bees. Three class hours and two two-hour laboratory periods a week.

Assistant Professor Phillips

HOME ECONOMICS

Foods I. Foods and Nutrition. — Fundamental knowledge of foods. A study of foods, their comparative composition, cost and economic value. Underlying principles of good nutrition, fuel requirements of the body under varying conditions according to age, weight, etc., in health and in sickness. Infant feeding and feeding of children. Planning of diets. Practice in selection and preparation of typical foods. Two lectures and three two-hour laboratory periods a week; four weeks.

Miss Hall

Foods II. Preparation and Serving of Meals. — Foods and Nutrition, or its equivalent in home experience in plain cookery, is a prerequisite for preparation and serving of meals. It is assumed that students know the technique of cookery before entering this course. This course includes a study of food combinations and menu making. There will be practical work in the preparation and serving of meals for the family with relation to the cost and nutritive value of the food and the time and labor involved in the preparation and service. Two lectures and three two-hour laboratory periods a week; four weeks.

Miss Hall

Clothing I. Garment Making. — This course is planned for those who have had little or no training in sewing. It aims to give knowledge of the technique and uses of various stitches and finishes ordinarily employed in the making of garments. It also includes operation of the sewing machine, a study of suitable materials, and the making of simple patterns, together with their practical application. Two lectures and three two-hour laboratory periods a week; four weeks.

Miss Grizzle

Clothing II. Dress Design and Construction. — Clothing I, or its equivalent, required for enrollment in this course. A study of the principles of design, line, color, and form as applied to the planning and making of dresses and the use of decorations. Individual types of figures and colorings will be studied with a view to a becoming and tasteful expression of the personality of the wearer. Selection of materials and use of patterns will be considered in connection with the laboratory work. Two lectures and three two-hour laboratory periods a week; four weeks.

Miss Grizzle

Clothing III. Millinery. — The selection of color and form as related to the individual, the wardrobe, the occasion, and the season will be given careful attention. Laboratory work will include the making and covering of hat frames; trimmings, bows, pleatings, hand-made flowers, together with remodeling and renovating hats. Two lectures and three two-hour laboratory periods a week; four weeks. Two sections.

Miss Bolingbroke

House Furnishing. — This course aims to develop good judgment and right standards in the selection and arrangement of home furnishings that they may express themselves in their environment. A well-arranged, attractive home contributes largely towards a contented happy home life. There will be discussions of color combinations, good spacing, also the treatment of floors, walls and wood-work, and practical problems in the choice and arrangement of furnishing from a sanitary, economic, and artistic standpoint. Use will be made of illustrative material. Two lectures a week; four weeks.

Miss Craig

Home Management. — Since women are largely responsible for all expenditures connected with the home, an important consideration in this course is the study of the family income and its equivalent in productive labor within the household, family expenditures and their

regulations, and the budget as a measure of standards of living. Equally important is the standardization of household tasks, the study of special methods of work, the selection and care of equipment, and the use of time and labor saving devices. Three lectures a week; four weeks.

Miss Craig

RELATED SUBJECTS

Insect Life. — This is an introductory course arranged with particular reference to the needs of teachers in grade schools and high schools who are expected to teach about insects, either as a part of nature study or in their relation to agriculture. The course is also planned to be a useful one for persons not teachers who desire a general knowledge of insects and methods for their control. Familiarity with the most common insects, particularly the injurious ones, a general knowledge of how they live and how and when they may best be attacked, are the main topics included in the lecture work. Field exercises, examining living insects, their habits, and the injuries they cause will be arranged for in addition to the regularly scheduled hours for those who may desire them. Five exercises a week; four weeks.

Bird Life. — A first-hand study of the local bird fauna, conducted largely in the field. Special attention is given to economic relations of the birds and to nesting habits. In addition to daily lectures on birds, walks will be taken each afternoon for field observation and study of songs, habits, etc. Five exercises a week; four weeks. Not offered in 1922.

Recreation. — The theory and demonstration of play as a creative force, developing in the individual social consciousness, and in the group individual responsibility for standards of living in the home and the community. There will be special emphasis on methods of organizing and directing games. An effort will be made to work out games that will contribute to the social life of the com-

munity. Demonstrations form a prominent feature of the work. Three lectures and two afternoon demonstrations a week; four weeks. Not offered in 1922.

Dramatic Presentation. — The great field for the drama in the rural communities as an aid to scientific methods in agriculture, high standards in rural life, and for self-development and delight, makes some knowledge of the interpretation of plays, of the stage and its parts, of its effective use and of the art of acting, very desirable. The members of this class will be rehearsed in several plays. Each member will appear in one or more plays. One or two of the best plays will be given a final presentation before the school. Five hours a week; four weeks.

Professor Patterson

Design and Practical Arts. — Lectures and laboratory work developing the value of design, color, and handwork as a rural school asset. Work in binding and its various problems, basketry, elementary weaving, thin and thick cardboard construction, leather work, and rural dyeing; also other phases of rural prevocational subject matter; also rural community craft-work. Those taking this work should bring 9 by 12 inch drawing paper, carbon paper, scissors, ruler, eraser, knife, and pencils. Five exercises a week; four weeks.

Mr. Ried

Elements of Rural Sociology. — A study of the religious, educational and social ideals prevailing in rural communities; a consideration of rural institutions, school, church, local government and rural organization. The course is designed for those who wish a good general working knowledge of the subject-matter of rural sociology. Five periods a week; four weeks.

Professor Phelan

Seminar in Rural Sociology. — A seminar course designed for teachers, or prospective teachers, of rural sociology will be offered. Registration for this course will be limited to men who in the judgment of the instructor could later be recommended for a position. Five periods a week; four weeks.

Professor Phelan

Hygiene and Sanitation. — The course will treat the following subjects: (1) the human body in health and disease; (2) micro-organisms of disease; (3) products of micro-organisms and disease production; (4) channels of infection; (5) air and health; (6) water supply; (7) sewage disposal; (8) milk supply; (9) food poisonings; (10) food infections; (11) reciprocal relation of body and causal agent of disease; (12) factors of resistance; (13) vaccines; (14) use of sera, etc.; (15) infectious diseases; (16) infectious diseases; (17) isolation and disinfection; (18) principles of personal hygiene; (19) public health organization; (20) health, — a private and public asset. This course is especially designed to meet the needs of public schools. Demonstrations and lectures. Five hours per week; four weeks.

Professor Marshall

INSTITUTE FOR ADVANCED STUDY IN AGRICULTURAL EDUCATION

The third annual session of the Institute for Advanced Study in Agricultural Education will consider some of the most important phases of the preparation of the prospective teacher, and will continue the study of professional improvement for the experienced teacher. Time brings the conviction that the teacher of agriculture must know how the work of related fields is planned and carried out. Consequently some of the courses offered are directly agricultural method courses, and some have an indirect agricultural bearing. This applies to such matters as the supervision of agricultural teaching and the broader fields of vocational education as represented in Courses 104 and 108.

The Department of Agricultural Education, in co-operation with the Division of Vocational Education of the State Department, offers courses at the College which are aimed directly at the things a man in the position of agricultural teacher, director, supervisor, educational manager or teacher-trainer must know and be able to do in order to carry on his work successfully. They are also of especial value to high school teachers and school superintendents who contemplate making agriculture an integral part of their school work. These courses are full of the experience and best judgment of men who have made good in the positions concerned. The lectures and discussions cover the duties, problems and possibilities of the various types of positions in agricultural education.

The study of science in connection with the pupil's home project during the spring and summer months needs more emphasis than it has been getting. The direction of this study is one of the important problems which the teacher of agriculture must face in the immediate future. This subject of summer science for agricultural students

will be given a prominent place in Course 76 at the coming session of the institute.

The following courses are offered:—

51. Principles and Methods of Teaching.—Methods of teaching should be based on the principles of teaching. Principles of teaching are based on the laws of learning. The chief emphasis of the work in this course is placed upon the learning processes. Special consideration will be given to spontaneous or involuntary noting, purposeful or voluntary observation, apperception, remembering, analysis and synthesis, judging and reasoning, interest, etc. These will be presented as mental processes from the standpoint of psychology, and also as learning processes from the standpoint of teaching. Five hours per week; four weeks.

Professor Hart

76. Special Methods in Vocational Agricultural Teaching.—This course covers the problems that confront the teacher of agriculture and ways of meeting them. Summer science will receive adequate treatment in this course, as noted above. Five hours per week; four weeks.

Professor Welles

103. Professional Improvement Problems.—The name of this course indicates its adaptation to special needs of the particular people in the group. The subject-matter varies from one season to another. It is a seminar course primarily for employed teachers and directors of vocational agriculture (prospective candidates admitted). It deals with the Massachusetts system as it is and the problems confronting the instructor. It includes plans for the coming season and campaigns for improved methods based on experiences of men in service. It may include such topics as "Measurement of Results of Teaching," "Correlated and Related Study," "The Home-Project Basis of Teaching," "Summer Teaching," and "Individual Differences."

In case a sufficient number of both experienced and untrained men apply for this course, the group may be divided into two sections. Five double periods each week for the first two weeks; five single periods each week for the remainder of the term.

Mr. Heald

104. Supervision and Administration of Agricultural Education. — This course covers the problems of agricultural teaching as seen by educational managers, State directors, and supervisors of agricultural education in maintaining the efficiency of this work in the State. It deals with the interrelations of the work of teachers and administrators. New phases of this work as compared with those treated in previous years will form the main topics for consideration. Five hours per week; four weeks.

Mr. Heald

Professor Welles

108. Vocational Education. — The work of this course is based on a textual study of the Smith-Hughes Act and other Federal laws having a direct bearing upon vocational education; State laws supplementing Federal laws; policies and rulings of the Federal Board for Vocational Education, and State plans of administering both State and Federal laws designed to promote vocational education. New phases of this work as compared with those treated in previous years will be the main topics for consideration. Five hours per week; four weeks.

To be announced

Graduate Seminar in Agricultural Education. — A graduate seminar will be conducted for students already enrolled in this Department, as well as others qualified to matriculate in the Graduate School of the Massachusetts Agricultural College. This work may be done with or without reference to securing an advanced degree. Credit will be given in accordance with the amount and character of work done. Time and topics for study will be arranged to suit individual needs.

Professor Hart

SHORT COURSES AT MASSACHUSETTS AGRICULTURAL COLLEGE

THE WINTER SCHOOL

The dates of this school are approximately from January 1 to March 10. The following subjects are offered: general agriculture, including agronomy, types and breeds, live-stock feeding, animal breeding, dairying, animal diseases, poultry husbandry, fruit growing, vegetable gardening, floriculture, horticulture, farm management, botany, entomology, sanitation and hygiene, farm structures, etc.; home-making, including foods, clothing, business of the household, and home care of the sick; professional improvement problems and agricultural education. It appeals to practical farmers and all who wish short, intensive, yet thorough courses suited to the practical man.

TWO-YEAR COURSE

This course was begun in 1918, with an enrollment of 38 students. It has now approximately 350 students. The course is divided into seven sections: dairying, animal husbandry, poultry, floriculture, horticulture, pomology, and vegetable gardening.

The first year consists of six months' study at the College and six months of required farm placement training, under the supervision of the College. During the placement period the student is expected to hold a job on a farm in the dairy or greenhouse, as the case may be, earn wages, and learn much of the practical side of the work.

The second year consists of nine months' study at the College. On the completion of the course a certificate is granted. Tuition is free to residents of the Commonwealth.

ONE-YEAR VOCATIONAL POULTRY COURSE

This course is limited to 12 students. It begins January 1 of each year. Students are required to do a large amount of practical work at the College plant. It provides excellent training for the man who wishes to go into poultry as a business. In the past it has been one of the most popular of the Short Courses.

THE COURSE FOR COUNTRY CLERGYMEN

The program for this course is arranged each year to meet the needs of the clergymen in small communities. A copy of the program may be had by writing to the College.

APPLICATION FOR ENROLLMENT

IN THE

SUMMER SCHOOL

MASSACHUSETTS AGRICULTURAL COLLEGE, AMHERST

Name.....

Date of application.....

Post office.....Street.....State.....

Present occupation.....

Previous education.....

Name and address of person to whom word may be sent in case of illness
or accident:.....

Mail this blank to JOHN PHELAN, Director of Short Courses, Massachusetts Agricultural College.

MASSACHUSETTS
AGRICULTURAL COLLEGE

THE TEN WEEKS' WINTER SCHOOL

1923





A view of the campus

To accommodate students who wish a general course in dairying in connection with the other Winter School subjects, arrangements will be made for the organization of a special ten weeks' course not described in this bulletin. This course will be similar to that offered in previous years and will be offered if elected by ten regular students of the Winter School.

THE M. A. C. BULLETIN

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The Ten Weeks' Winter School

AT THE

MASSACHUSETTS AGRICULTURAL COLLEGE



BOSTON

WRIGHT & POTTER PRINTING COMPANY, STATE PRINTERS
32 DERNE STREET

1922

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APPROVED BY THE
SUPERVISOR OF ADMINISTRATION.

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President of the College

EDWARD M. LEWIS, A.M.

Dean of the College

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Director of Short Courses

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Assistant Professor of Entomology

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Professor of Horticultural Manufactures

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<i>Foreman of Floriculture Department</i>	
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JOHN J. MAGINNIS	Agricultural Economics
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CHARLES E. MARSHALL, Ph.D.	Microbiology
<i>Professor of Microbiology</i>	

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CHARLES H. THAYER	Agronomy
<i>Instructor in Agronomy</i>	
CLARK L. THAYER, B.Sc.	Floriculture
<i>Professor of Floriculture</i>	

DEPARTMENT

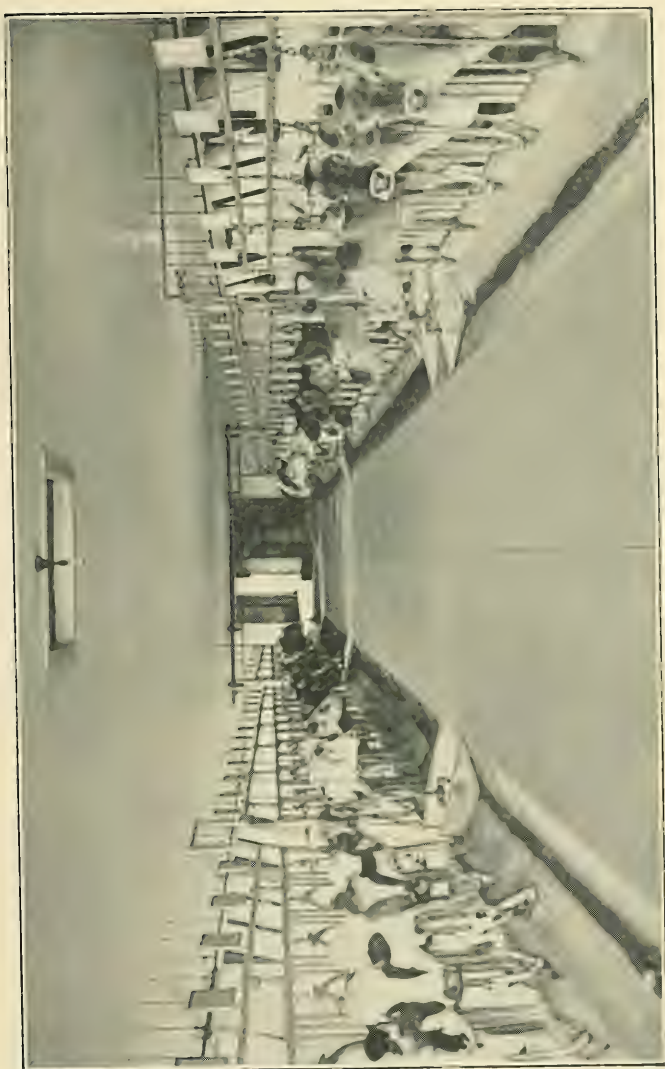
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<i>Assistant Professor of Dairying</i>	
HENRY S. GREEN, A.B., LL.D.	
<i>Librarian of the College</i>	



Mixing fertilizer



Studying field crops



The dairy barn and herd

THE TEN WEEKS' WINTER SCHOOL

January 1 to March 10, 1923

The Winter School has been maintained by the college for twenty years. It meets a definite need in providing instruction for groups of men and women who can most conveniently leave the farm during the winter months. The school closes in time for students to return to take up the spring work.

In addition to the regular Winter School, the attention of the student is directed to the following special schools described in this bulletin offered during the winter period:—

The Practical and Scientific Course for Nurserymen.
The Vocational Poultry Course.
The Dairy School.

In order that the Winter School may serve as many people of the Commonwealth as wish to take advantage of it, no entrance requirements have been fixed other than that the student shall be at least eighteen years of age and shall have completed the elementary or common school. The expenses are very moderate.

The instruction is thorough. The regular faculty teach the Winter School, assisted, if necessary, by additional instructors and lecturers from outside.

There are no required courses. The advice of the faculty in regard to the course may be had, but the students are left free to select the courses in which they are interested.

A social program is arranged for the Winter School in order that students may enjoy the advantages of college life. One of the most

pleasant features of the Winter School in previous years has been the strong group spirit developed through wise leadership on the part of the student body.

The college does not guarantee positions, but frequently has calls for capable, energetic men and women with farm experience. Students interested in securing positions should consult the Supervisor of Farm Placement Training early in the winter. Employers who wish to secure the services of reliable men are also advised to take the matter up directly with the Supervisor of Farm Placement Training in the Short Course Office.

TUITION, FEES AND EXPENSES

There is no tuition in the Winter School, but each student is required to pay to the Treasurer a \$5 registration fee. There are no laboratory fees in connection with any of the courses. The registration fee, unless sent in advance, must be paid at the time of registration to the Treasurer of the college.

Board may be obtained at the college dining hall for approximately \$7 a week. Rent for furnished rooms in private houses varies in price from \$2.50 to \$4 a week for each occupant. There is room for a limited number of women students in the new women's dormitory. Make application for reservation immediately to Miss Edna Skinner, dean of women, Massachusetts Agricultural College. The price per week will be approximately \$3 for each occupant. Information regarding room and board may be obtained at the Short Course Office.

REGISTRATION

Students will be registered in classes Monday, January 1, at the Short Course Office. Classes will begin Tuesday, January 2, at 8 o'clock A.M.

Each student wishing to register for the Winter School must furnish in advance the names and addresses of two citizens who will recommend him as to moral character.

Upon arrival the student should report at the office of the Director of Short Courses, located in South College; telephone 424-R.

RULES AND REGULATIONS

The choice of subjects is left to the student, but students are advised to elect not less than ten nor more than twenty-five hours per week. All variations from this rule must be approved by the Director of Short Courses.

A class that meets for one hour a day for five days per week is reckoned as five credit hours. A two or three hour laboratory period counts as one class hour.

Information in regard to books used in the various courses will be given by the instructors at the first meeting of the class. The necessary textbooks may be purchased at the Treasurer's office.

As a guide to those who come to the college for the first time, the following extracts are taken from the regular rules of the college:—

The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standard of student deportment.

It should be understood that the college, acting through its president or any administrative officer designated by him, distinctly reserves the right not only to suspend, but also to name conditions under which students may remain in the institution.

Regularity of attendance and conformity to general college rules are required of all Winter School students.

THE LIBRARY

The college library occupies the entire lower floor and basement of the Chapel-Library building. It contains more than 60,000 volumes in addition to a large number of unbound periodicals and pamphlets. Works on agriculture, horticulture, botany, entomology, and the various sciences predominate, but literature, history, economics, and sociology are well represented and receive due attention. In addition to a few newspapers and the best farm papers, the reading room

is supplied with a good variety of popular periodical literature, encyclopedias, and general reference books. The equipment is such that the library ranks extremely well with the agricultural libraries of the country.

An agricultural reference library is maintained in Stockbridge Hall. Other branch libraries and reading rooms are provided in the department buildings, and these are open for the use of the Short Course and regular college students.

The library hours are from 8 A.M. to 9.30 P.M. every week day, and from 10 A.M. to 1 P.M. on Sunday in term time. Shorter hours prevail during the vacation season.

Short Course students should be able to find excellent material for their lines of work, and are cordially invited to make use of the library and its equipment. The librarian and library assistants are always on hand, ready and willing to be of assistance.

THE INFIRMARY

The college maintains an infirmary for the care of sick or injured students. Students are urged to go to the infirmary when in need of the services rendered by the resident nurse or by a physician. Inasmuch as the physical director gives special attention to all student diseases, it is to be expected that students will go to the infirmary at his suggestion.

The infirmary fee is \$2 a day, and will be charged when one or more meals are obtained at the infirmary, or when the student remains at the infirmary for one or more nights.

SCHOLARSHIPS

The Jewish Agricultural and Industrial Aid Society of New York instituted in 1908 a system of free scholarships to enable the children of Jewish farmers to attend the short winter courses offered by the agricultural colleges in the states in which they reside. The scholarships are awarded by competition, which consists in the writing of a brief essay on an agricultural topic. Children of Jewish farmers liv-

ing and working on the farms of their parents are eligible to compete for these scholarships.

Applications for these scholarships should be made to The Jewish Agricultural and Industrial Aid Society, 174 Second Avenue, New York City.

POSITIONS

A student desiring a recommendation from the college must meet the following conditions: —

1. He must be of good character.
2. His previous record must be good.
3. His work in all courses must be satisfactory.

Students who have not previously had a considerable amount of farm experience cannot, as a rule, be recommended for positions of responsibility. This is especially true for the better positions for which managers or superintendents are wanted.

DESCRIPTION OF COURSES

GENERAL AGRICULTURE

Soil Fertility

A course in which the origin of soils, their properties and management, will be studied. Emphasis will be placed on: the control of soil moisture; tilth and tillage; importance and maintenance of soil organic matter; manures, — their composition, value, preservation, and use; limes and liming; and the properties and use of commercial fertilizers. Two lectures and one two-hour laboratory period.

Mr. Thayer and the Department

Field Crops

The production of field crops for New England; species and varieties, agricultural characteristics, methods of culture, rotations, harvesting and curing. The laboratory work gives the student practice in seed selection and testing for quality, purity and germination, and in corn and potato judging. Course 1 required. Two lectures and one two-hour laboratory period a week.

Assistant Professor Michels and the Department

Types and Breeds of Live Stock

Outlines of the market classes and grades of beef cattle, horses, sheep, and swine, placing emphasis upon the characteristics of each class and its adaptations. The characteristics, the adaptations, and so far as is possible the historic development of each of the more

important breeds of live stock are also carefully studied, as well as their distribution in America. Special emphasis is laid upon dairy cattle and horses in the judging work. Three lectures and two two-hour judging periods a week.

Mr. W. C. Thayer

Live Stock Feeding

A study of the physiology of nutrition, the composition of feed-stuffs, and of rational economic feeding. The feeding of dairy cattle and their management for profitable milk production receives first attention. Similarly, the feeding of horses, of beef cattle, of sheep, and of swine is studied. Three lectures a week.

Assistant Professor Glatfelter

Animal Breeding

A discussion of the more common problems pertaining to the breeding of live stock, their explanation and solution; in-breeding; cross-breeding; grading. The work of the most successful men in history is studied. Time is given to the study of pedigrees of the different breeds of dairy cattle and other stock. One lecture and one two-hour laboratory periods a week.

Assistant Professor Rice

Dairy Bacteriology

The characteristics and functions of bacteria and their relation to the different branches of the dairy industry. The scientific basis for cream ripening, sterilization, pasteurization, control of fermentation, and the production of the best quality of market milk. Two lectures and one two-hour laboratory period a week.

Professor Marshall and Miss Garvey

Animal Diseases

This course acquaints the student with the more common diseases to which domesticated animals are susceptible. Particular attention is given to conditions favoring diseases, to communicable diseases, and to prophylactic measures, in order that the student may be able to reduce the prevalence of diseases among animals in his charge. Five class hours a week.

Dr. J. B. Lentz

Poultry Diseases

This course is planned for students specializing in poultry work. Anatomy and physiology of the domestic fowl are briefly considered, and particular attention is devoted to the diseases which may cause heavy losses in the flock. Prevention rather than cure is emphasized. Five class hours a week.

Dr. J. B. Lentz

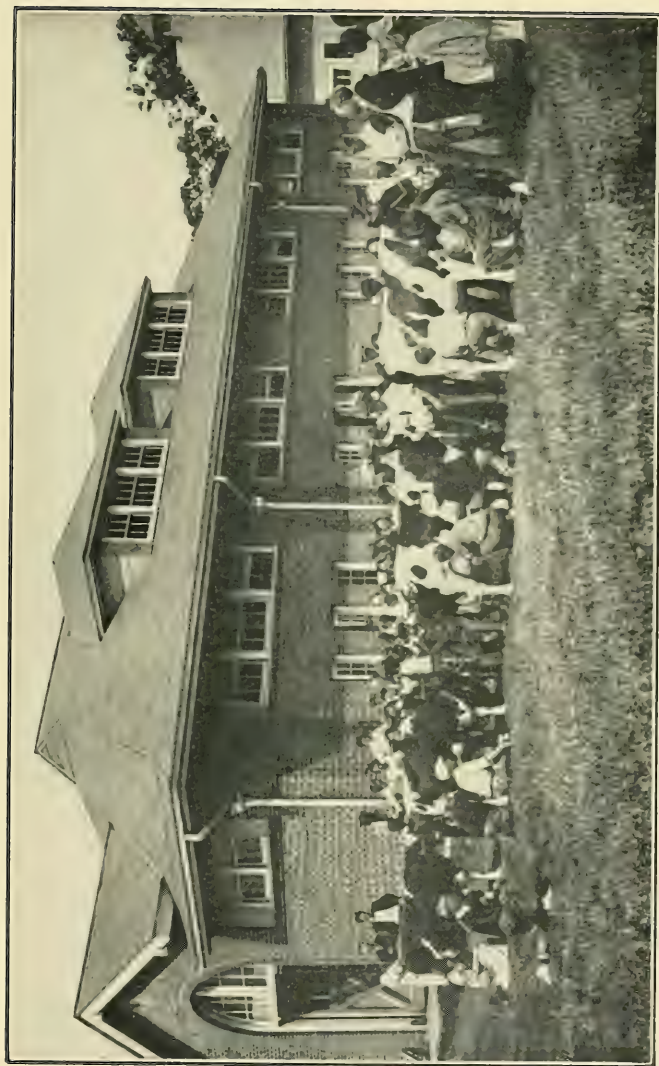
Poultry Husbandry

This course meets the needs of those who can spend only a short time at the college, but who wish to get a general survey of poultry keeping and some technical knowledge of the latest and most scientific methods in vogue. It is a lecture and laboratory course, the former covering opportunities in poultry culture, poultry housing, winter egg production, incubation and brooding, feeds and feeding, poultry management, and the most popular methods of marketing poultry and eggs in Massachusetts. The laboratory work consists of demonstrations and practical work in killing, picking, caponizing, judging and culling for egg production, and studying types and construction of incubators and brooders. Practical work in operating incubators is given to as many as can be accommodated. The large poultry plant furnishes facilities for demonstrating various methods of housing and feeding. A splendid opportunity is afforded those who have time for observation work outside of class hours. Five lectures and one two-hour laboratory period per week.

Assistant Professor Banta



Constructing a poultry house



Grinnell Arena, used for stock judging and exhibition

Fruit Growing

This course deals with the practical side of the growing and marketing of fruits. Especial attention is given to such questions as selection of site for the plantation, choice of varieties, grafting and budding, spraying, pruning, cultivation and cover crops, fertilizing the fruit plantation, packing and marketing. Lectures, supplemented by demonstrations, and whenever possible, actual work by the student. Students electing fruit growing are also required to take soil fertility, and it is recommended that they take botany and entomology. Three lectures and one two-hour laboratory period a week.

Assistant Professor Drain

Vegetable Gardening

The successful commercial production of vegetables requires a clear understanding of the problems that the vegetable grower meets. Practical contact is made with the problem in so far as the season of the year and time devoted to the work permit. Classroom instruction makes clear the fundamental principles underlying the problem, and gives opportunity for discussion. The laboratory periods aim to give the student practice in applying the fundamental principles to the problems he is to meet as a commercial vegetable grower. Some of these will be discussed under the leadership of market gardeners and specialists.

Students electing this course are required to take soil fertility, and it is recommended that they take botany and entomology. Three lectures and two two-hour laboratory periods a week.

Assistant Professor Harris

Floriculture

This course is outlined primarily for students who are interested in commercial floriculture. Some of the subjects considered are: greenhouse construction and heating, greenhouse management, cul-

ture of the important commercial crops, and floral arrangement. A portion of the course will be devoted to a consideration of gardening and garden flowers. Special trips are taken to study floricultural establishments in the State; students desiring credit for the course are required to take these trips. A series of lectures will be given by men who are engaged in various phases of floricultural work. Students taking this course are required to take soil fertility, and it is recommended that they take fruit growing and vegetable gardening. Five lectures a week; laboratory work or field trips on Saturday.

Professor Thayer and Mr. Hubbard

Horticultural Manufactures

The utilization of culls and low-grade fruits and vegetables, and the marketing of excess crops are always serious problems to the producer. The economic conversion of these materials into palatable nutritious food products is becoming a greater necessity each year.

This course aims to place before the student the fundamental principles underlying the various means of food preservation and the manufacturing of food products.

The canning, drying, and storage of fruits and vegetables, together with the manufacture of many of their products, will be studied in detail, and the methods illustrated with laboratory exercises. Students will be given opportunity to do canning and drying, to manufacture many fruit and vegetable products, and to investigate storage conditions. The work in both classroom and laboratory will be of such a character as to be readily applied in the home or in the farm factory. Two lectures and two laboratory periods per week. Class limited to sixteen students.

Professor Chenoweth and Mr. Robertson



Nursery practice



Class work in greenhouses

Farm Management

A study of some of the problems of modern farming and the factors that influence success, such as the choice of a region and of a farm, types of farming, size of farm, rotation of crops, and labor problems. Two lectures a week.

Professor Foord

Farm Accounts

Actual practice in the use of a simple system of farm accounting, including cost accounts suitable for the large or the small farm. Two two-hour laboratory periods a week.

Professor Foord

The Supply and Marketing of Farm Products in Massachusetts

The course will attempt to show what products New England can most profitably produce and how and when they can best be marketed. The principles of marketing, the importance of marketing as compared with production, the best outlets for sale, proper methods of preparation, packing, shipping, storing, advertising and selling, direct marketing, use of motor truck, trolley freight and express, collective selling, planning production with a view to marketing, will be some of the topics presented. Each student will be given an opportunity to study the market for some product in which he is interested. Twenty lectures.

Mr. Maginnis

Sources and Use of Agricultural Credit

The course deals with the need, the sources, the methods of obtaining farm capital in New England. When and when not to borrow; length of loan, methods of payment, interest, amortization, loan associations, Federal land banks, mortgage credit, personal loans, collat-

eral, and like practical topics are discussed. Safe and unsafe securities, notes, bonds, stocks, and investments are discussed. Twenty lectures.

Assistant Professor Sawtelle

Botany

A study of the structure, functions, and diseases of greenhouse, garden, orchard, and field crops, together with methods of disease prevention, including spraying and the application of fungicides. Two one-hour periods a week.

Assistant Professor McLaughlin

Entomology

The course in entomology covers the topics outlined below. It is aimed to cover the fundamentals of the subject rather fully. Time will permit the discussion of only the more important of the injurious and beneficial insects with which we have to deal in this section of the country.

1. Insects and their nearest relatives -- how to distinguish them.
2. Structure or make-up of insects and the practical application of this knowledge in insect control.
3. Development, metamorphoses (changes), and stages of insect life.
4. Composition, preparation, combination, and use of insecticides, fumigants, etc.
5. Spraying apparatus and its use.
6. Beneficial and injurious insects.
 - A. The life history, habits, behavior, and control of some of the most important insect pests.
 - B. Beneficial insects.

Three lectures a week.

Assistant Professor Alexander

Farm Structures

A study of design and arrangement of farm buildings, including the general purpose barn, dairy stable, horse barn, milk house, ice house, root cellar, etc.; building materials used in farm construction; heating and lighting systems and road construction.

Working drawings of farm buildings will be prepared, a complete set of drawings being worked up by each student from any design problem he may select. Practice is given in the care and use of carpenter's tools through bench work, repair of farm equipment, and building construction. Small buildings are erected by the students to give practice in all the phases of house construction. Practice is given in the building of forms and in the mixing and placing of concrete. One lecture and four two-hour laboratory periods per week.

Assistant Professor Strahan and Mr. Pushee

Farm Motors

This course deals with the gasoline engine as used for stationary work, automobiles, and tractors. Instruction is given by means of lectures and textbooks, and by operating and repairing stationary engines, automobiles, and tractors. Special attention is given to overhauling and repairing. Three class hours and two two-hour laboratory periods a week.

Professor Gunness and Mr. Pushee

Rural Sanitary Science and Hygiene

Significance of sanitary science in the relation to health; the theories of disease; air and ventilation; water and its protection; sewage, disposal and purification; foods, their care, preservation, decomposition, and nutrition; vaccines and serum treatment; carriers of disease, immunity, and susceptibility; infectious diseases; disinfection and care of infectious diseases. Two lectures a week.

Professor Marshall

Agricultural Opportunities for Women

A course for the woman who is interested in agriculture and who wishes to know what opportunities are open to her in that field. A study will be made of the types of agricultural work for which women are best adapted; of the special problems which will confront them in such work and how these may be met. Two class hours per week.

Miss Hamlin

HOMEMAKING

Owing to the increasing demand for instruction in homemaking, provision has been made in the Winter School for a course combining homemaking with agriculture.

There are many women and girls throughout the State who are vitally interested in studying home problems and at the same time would like to become proficient in some phase of agriculture, as poultry, gardening, floriculture, or fruit growing. The college is able to extend this unusual opportunity.

Attractive laboratories equipped for homemaking work will be at the disposal of all women students in the Winter School.

Foods

When one realizes that a large percentage of the family income must be spent for food, it is easy to understand that this is one of the most timely topics of the day in the interest of thrift and health.

Special study will be made of the needs of the body and the selection of foods to supply those needs; also care in the handling and keeping of foods. Emphasis will be given to the application of fundamental principles in planning balanced menus. An unwise selection of foods may result in malnutrition rather than in health.

Consideration will be given also to such special problems as infant feeding and school lunches. This course will include laboratory work of practical value. Two lectures and two two-hour laboratory periods per week.

Clothing

Consideration will be given to making over and extending the use of fabrics as well as the selection of new materials. Their character, cost, and durability are studied with reference to planning a wardrobe for a limited income, emphasizing the beauty of simplicity and suitability. There will be practical work in sewing and making garments. Two lectures and two two-hour laboratory periods per week.

Miss Bartley

Millinery

The selection of color and form as related to the individual, the wardrobe, the occasion and the season will be given careful attention. Laboratory work will include covering of hat frames with velvet, silk, net and straw; lining and finishing; trimmings, bows, pleatings, hand-made flowers, together with pressing and renovating materials. One lecture and two two-hour laboratory periods per week.

Miss Bartley

The Business of the Household

Good management is a science. For generations women have failed to apply to the business of homemaking many efficient methods so successfully used in the business world.

Since the homemaker is largely responsible for all expenditures connected with the house, an important consideration in this course is the study of the family budget, the apportionment of the income, and the keeping of accounts.

Equally important is the standardization of household tasks, the study of systematic methods of work, selection and care of equipment, the use of time and labor-saving devices. Three class hours per week.

Mrs. Dimock

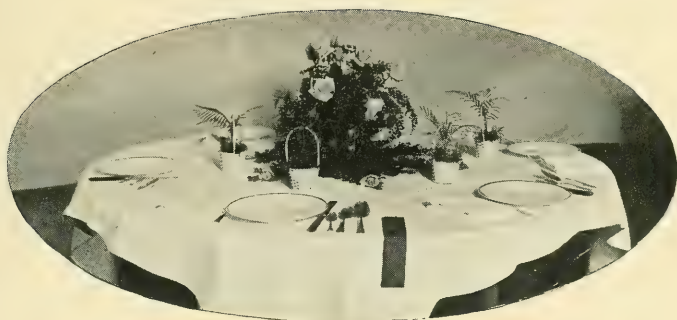


Table decoration by the class in floriculture



A course in the cooking school

Home Care of the Sick

Health preservation and home care of the sick are of prime importance. It should be far easier to keep well than to become sick, provided one understands the fundamental principles of hygiene, thus insuring the care of family health.

Every homemaker needs some knowledge of home care of the sick, including the study of simple diseases and their prevention, the care of young children and invalids, and first aid to the injured. Three class hours per week.

Miss Skinner

VOCATIONAL AGRICULTURAL TEACHING

The Massachusetts Agricultural College has been designated by the Massachusetts Department of Education as the institution for training teachers of vocational agriculture for the State. The work is being carried along the following lines: —

1. Regular college courses, four or five years, leading to a degree.

2. Shorter courses to supplement the training of more mature men who are partly qualified through practical experience, or through scientific study of agriculture, or through study of methods and principles of education, or through teaching experience.

3. Professional improvement training for employed teachers in regular college courses, or courses in the winter term, or courses specially organized on request of a sufficient number of students.

The Winter Short Course period provides in part for the second and third lines. An intensive course during the first two weeks is provided for the instructors who may leave their teaching for only a brief period. This course may be continued on a lighter schedule for such persons as may be able to remain throughout the winter term.

For all of these there will be an opportunity to take courses in general agricultural teaching, special Massachusetts problems, and agricultural subject-matter. An attempt will be made to furnish any subject-matter course which enough men may request.

High school principals and science teachers who have had farm experience, or practical agriculturists, may find this an opportunity to qualify for vocational teaching, — a field in which the demand is fairly strong.

The educational courses supplemented by an adequate amount of agriculture will be credited by the Department of Education

towards approval of candidates or for professional improvement programs. Similar courses are offered in the summer school.

The following courses have proved to be of greatest benefit to those enrolled at this time: —

Principles and Methods of Teaching

The aim of this course is to present the fundamental principles of teaching as applied to high school students. It treats such topics as interest, apperception, imaging, reasoning, and other activities of the mind in its learning processes, and endeavors to apply the study of these in each student's case in order that he may learn to promote such mind activities in others. Such matters as discipline, lesson plans, teaching efficiency and other topics of general method are thoroughly handled and illustrative work done. Five exercises per week.

Professor Welles

Special Methods in Vocational Agricultural Teaching

This course consists of intensive work on the important principles underlying the successful teaching of vocational agriculture and a thorough study of the special plans and activities of the teacher of this subject. The job is analyzed to determine what the teacher must know as to character, setting, technique, and relations of his work. All available sources are consulted for information as to State requirements, industrial conformity, and professional ideals. Illustrative material showing how particular departments and schools work out their problems in this subject is gathered and studied. Plans for the year's work, unit study and daily lessons are worked out on the home-project basis. Special lessons are planned and taught by students in moot class.

In case both experienced and untrained men apply for this course, the group may be divided into two sections. Five exercises per week.

Professor Welles

Professional Improvement Problems

A seminar course for employed teachers or directors of vocational agriculture, dealing with problems which constantly arise in the agricultural schools of the State. Prospective teachers may be admitted by special arrangement. Includes plans for the coming season, and campaigns for improved methods based on experiences and needs of men in service; for this season special emphasis on summer teaching of related subjects, and the proper approach to teaching a vocational topic.

Under special arrangement of the Massachusetts Department of Education and the Massachusetts Agricultural College, students in this course may be admitted to Professor Welles' class in principles and methods of teaching.

Class meets for double periods five days each week for two weeks. May be continued, on request, for a longer term at four days each week.

Mr. Heald

Seminar Course in Agricultural Education

This course is designed primarily for graduate students. The work is planned for persons holding supervisory positions, such as principalships, superintendencies, directorships, etc., as well as for teachers who are looking forward to such advanced positions. Such topics will be taken up for investigation as will meet the needs of the group electing this work. Such subjects as organization, supervision, and administration of agricultural schools and vocational education are included.

Students who are eligible to the graduate school of the Massachusetts Agricultural College may receive credit towards an advanced degree for this work if their undergraduate studies in education warrant it. By arrangement.

Professor Hart

NURSERY PRACTICE — PRACTICAL AND SCIENTIFIC COURSE FOR NURSERYMEN

January 2 to March 10, 1923

A special course for men engaged in nursery work will be given by the Massachusetts Agricultural College beginning January 2 and running through a period of ten weeks, closing March 10, 1922. This course has been provided at the request of the New England Nurserymen's Association and is under the immediate direction of the standing committee on education of that society. The plan has the further support and co-operation of the Massachusetts Nurserymen's Association and the Connecticut Nurserymen's Association.

General Plan

This course of ten weeks will follow the same general plan as the Ten Weeks' Short Course long maintained by the Massachusetts Agricultural College. It will, in fact, be a part of this regular Winter School, the students in the Nursery Course having all the advantages and privileges of the old-established course, but with studies especially adapted to the needs of nursery workers.

Program of Studies

The work as outlined by the committee on education of the Nurserymen's Association and scheduled for the coming term is as follows: —

1. Horticultural botany, the identification of plants, their correct names, the science of nomenclature, etc., by Assistant Professor C. H. Thompson.
2. Soils and fertilizers, covering the origin of soils, soil types, soil moisture, tillage, organic matter, humus, fertilizers, home-mixing, etc., by M. O. Lanphear.

3. Propagation and nursery practice, seeding, cutting, grafting, layering, seed beds, transplanting, pruning, growing on, digging, packing, etc.

4. Landscape construction, — how landscape plans are made and carried out, — including grading, planting, roadmaking, etc., by Assistant Professor Roland W. Rogers, under direction of Professor F. A. Waugh.

5. Special lectures by practical nurserymen, covering such topics as advertising and selling, nomenclature, certification, special crops, etc.

General Requirements

On account of limited facilities, only twenty-five students can be enrolled for instruction this year. Applicants should register early, as they will be accepted in the order of their application.

No entrance examinations are required, but it is expected that every student will have a reasonable general education, especially in the English language, and that he will have had considerable practical experience in nursery work. If possible, each student should bear a personal recommendation from his employer or from some person of his acquaintance, showing his personal experience in nursery work. The college reserves the right to reject any candidate obviously unqualified for the work, or to dismiss any student whose presence, for any reason, proves detrimental to other members of the school. Strict attention to the business in hand will be required of every one.

Those who complete the entire course with credit will receive the short-course certificate of the college.

Expenses

No tuition charge will be made. There will be a registration fee of \$5, and each man will be obliged to buy his own books, which will cost about \$10 more. Board and room will cost about the same in Amherst as elsewhere, approximately \$9 to \$10 a week.

Information

Those who desire further information regarding this course should communicate with any member of the committee, or with Professor Frank A. Waugh, Amherst, Mass. The members of the committee of the New England Nurserymen's Association are as follows: —

Mr. Richard Wyman, Framingham, Mass., Chairman.

Mr. Theodore F. Borst, of the Little Tree Farms, Framingham, Mass.

Mr. W. E. Campbell, Elm City Nurseries, New Haven, Conn.

The Massachusetts Nurserymen's Association is represented by Mr. Harlan P. Kelsey, Salem, Mass.

THE ONE-YEAR VOCATIONAL COURSE IN POULTRY HUSBANDRY

January 1 to December 22, 1923

Enrollment in the Vocational Poultry Course is limited to twelve students. Applications for this course should be made early.

The institution of the One-Year Vocational Course in Poultry Husbandry is to meet the needs of those who wish to specialize in this branch of agriculture and devote practically all of their time to it, and who feel they cannot spend either two or four years in college.

Entrance Requirements. — Applicants must be at least eighteen years of age and have a good elementary education.

Fees. — There is no tuition for residents of Massachusetts, but a laboratory fee of \$5 is required for the spring term, and the same for the fall term.

The material for this course has been carefully selected from the various courses for the four-year students. Use is made of the very practical portions, but enough of the more scientific work is given to enable the student to get a thorough grasp of the "whys and wherefores" of the subject. The former has been much enlarged upon, and an immense amount of practical laboratory work in care and management of poultry is required. "Learn to do by doing" is the slogan for this course. The aim is to develop as much skill as time will permit.

The general plan is as follows: —

Winter Term. — The student takes Course 1, outlined below, and in addition, farm accounts, avian pathology, agricultural economics, poultry husbandry, rural sanitary science, and hygiene. The student may elect either fruit growing or vegetable gardening. This plan

brings the student in contact with other members of the faculty, and acquaints him with important correlated work.

Spring Term. — From approximately April 4 until college closes, in June, the student takes Courses 1, 4, 5 and 7, devoting all his time to poultry work.

Fall Term. — The student continues Courses 1, 5 and 7, and in addition takes Courses 2 and 3, still devoting all his time to poultry work.

Course of Study

Course 1. Elementary Poultry Keeping. — A textbook course supplemented with lectures, recitations, etc., covering the entire field of elementary poultry keeping, special emphasis being laid upon the following subjects: opportunities in poultry keeping, poultry house construction, feeds and feeding, breeds and breeding, incubation, brooding, growing stock, poultry farm management, and poultry diseases. Five recitations per week throughout the year.

Course 2. — A practical laboratory course covering the following subjects: carpentry, fattening, killing, picking, dressing, caponizing, avian anatomy and physiology, making and applying disinfectants and lice powder, also identification and study of poultry feeds, etc. Two laboratory periods per week from October until December, inclusive.

Course 3. Poultry Judging. — Fall term. This course embodies the latest methods of judging egg production capacity by external characters as approved by the American Association of Instructors and Investigators in Poultry Husbandry; the history and evolution of our breeds and varieties of domestic fowl, their standard qualities, and their preparation and judging for exhibition purposes. In the latter portion of the course the "American Standard of Perfection" is used as a text. Two two-hour laboratory periods.

Course 4. — A practical laboratory course in incubation, brooding, and growing stock, equivalent to five laboratory periods per week from March to June, inclusive.

Course 5. — A conference, observation, and general reading course equivalent to one or two recitations per week during the fall and spring terms. In this course the student will become thoroughly acquainted with the best literature on poultry subjects through books, station bulletins, scientific articles, poultry magazines, etc. A thorough discussion of the problems met by the practical poultrymen is a strong feature of this course.

Course 6. Poultry Management. — A general poultry practice course in the care and management of poultry, the work to be done morning, noon, and night, and other periods as necessity requires, the class to be responsible for the work in caring for specified flocks under the supervision of instructors from April until college closes, and from October until December, inclusive.

Course 7. Elements of Poultry House Designing. — This course embraces the elements of mechanical drawing and the principles of designing; and special attention is given to the preparation of plans for all kinds of poultry buildings, including incubator cellars, brooder, laying, breeding, and growing houses; also feed hoppers, trapnests, and other equipment. Two two-hour laboratory periods per week. Credits, 2.

Department of Rural Engineering

THE TWO-YEAR COURSE IN PRACTICAL AGRICULTURE

The Two-Year Course in Practical Agriculture was organized in 1918. It is intended to give men and women who do not possess college entrance requirements an intensive practical preparation that will prepare them for farm pursuits.

The demand for this course has steadily increased. In 1918, 38 students were enrolled. The enrollment for 1919-20 was 324.

The first year of the course consists of six months of study at the college, and six months' practical farm experience on selected farms.

During the second year the student spends nine months in resident study, and on completion of the course receives a certificate showing the subjects he has taken during the period of residence.

The growth of the course has made it necessary to subdivide into groups of studies, in order that there may be more intensive specialization. As it is now organized, there are specially arranged courses in animal husbandry, poultry, dairy manufactures, general horticulture, pomology, floriculture, and vegetable gardening.

THE SUMMER SCHOOL

The Summer School at the Massachusetts Agricultural College has been a feature of Short Course work for fifteen years. In previous years the school has opened about July 1 and lasted for about four weeks. The following courses were offered in 1922:—

Poultry Husbandry	House Furnishing
Fruit Growing	Home Management
Flower Growing	Insect Life
Vegetable Gardening	Bird Life
Food Preservation	Recreation
Beekeeping	Dramatic Presentation
Foods and Nutrition	Design and Practical Arts
Preparation and Serving of Meals	Rural Sociology
Garment Making	Hygiene and Sanitation
Dress Design and Construction	Agricultural Education
Millinery	

It is expected that in the Summer School of 1923 six weeks' courses for credit will be offered in specially selected subjects.

WINTER SHORT COURSES

IN

DAIRYING

January 1 to February 21, 1923

MASSACHUSETTS AGRICULTURAL COLLEGE,
AMHERST, MASS.

STAFF OF INSTRUCTION, 1923

H. F. JUDKINS, B.Sc., *Professor of Dairying.*

T. G. YAXIS, M.S., *Assistant Professor of Dairying.*

H. L. PENDLETON, B.Sc., *Instructor in Dairying.*

R. W. SMITH, B.Sc., *Instructor in Dairying.*

In addition to the above, specialists in their respective branches will be secured for lectures. A commercial ice-cream maker will be engaged to help with the work in ice-cream making.

Calendar, January 1, 1923, to February 21, 1923.

- Course I. Testing Milk and its Products, Tuesday, January 2, 8 A.M., to Saturday, January 13, 12 M.
- Course II. Market Milk Handling and Soft Cheesemaking, Tuesday, January 16, 8 A.M., to Friday, January 27, 12 M.
- Course III. Ice-Cream Making, Tuesday, January 30, 8 A.M., to Saturday, February 10, 12 M.
- Course IV. Buttermaking, Tuesday, February 13, 8 A.M., to Wednesday, February 21, 5 P.M.

WINTER SHORT COURSES IN DAIRYING

GENERAL INFORMATION

Purpose. — A ten-week course in dairy manufactures has been conducted at the Massachusetts Agricultural College for a number of years as a part of the regular Ten-Weeks' Winter School. The students who have taken these courses have been largely farm boys without any dairy manufactures experience. The work in each subject was distributed over the entire ten weeks.

During recent years requests have come to the college from creamery, market, milk and ice-cream plant operators and workers, asking if it would not be possible to enroll for a few days for instruction along some line of dairy manufactures.

The courses have now been arranged so one can report for the first course January 1, and stay here and take all the courses ending February 21, or one can come and take either of the courses separately. There are no prerequisites, although one will have a somewhat better understanding and be able to accomplish a little more in the last three courses if he understands the testing of milk and its products.

Many a plant manager, foreman or worker would do better work and get more joy out of his work if he understood the reasons why he did certain things. It should be a paying investment for every dairy plant owner in the State to send one or more of his men to the college for one or more of these short courses. They are purposely given at a time of year when help can most easily be spared.

In addition to meeting the needs of experienced plant men the courses will continue to meet the needs of the more inexperienced men who will probably want to take all of the courses.

There is also another group, composed of farm men or women

who are responsible for milk handling, butter making or soft cheese-making on farms, who can profit by the courses as now arranged.

Admission. — There are no entrance requirements except that the student shall be eighteen years of age, and shall have completed the elementary or common schools.

Registration. — Students coming for the course "Testing Milk and its Products" will register Monday, January 1, at the Short Course office for this course as well as all others that they intend to take. Others coming in for the different courses will register on Monday preceding the opening of the course which starts with classes at 8 A.M. Tuesday. No classes are held on Mondays preceding the opening of a course, in order to give students time to get here and get located.

Upon arrival the student should report at the office of the Director of Short Courses, located in South College, telephone 424-R, for the purpose of registration and getting information relative to a room.

Students may enroll by mail by filling out the registration card that will be sent upon application. Enrollment by mail should be made early.

Tuition, Fees and Expenses. — There is no tuition fee in connection with any of the courses, but each student is required to pay to the Treasurer a registration fee of \$2 per course. There are no laboratory fees. The registration fee, unless sent in advance, must be paid at the time of registration to the Treasurer of the college.

Students will need white suits for laboratory work, and may wish to purchase one or more textbooks for each course.

Board may be obtained at the college dining hall for approximately \$7 a week. Rent for furnished rooms in private houses vary in price from \$2.50 to \$4 a week for each occupant.

Positions. — The Dairy Department is often called upon to recommend candidates for positions, and stands ready to recommend those who take these courses with the idea of getting a position, providing they are of good character, have a good previous record, and do satisfactory work in the courses.

Method of Instruction. — Instruction is given (1) by lecture, text-book, recitation and discussion, and working of problems; (2) by practical work in the laboratories. In general, two one-hour periods a day will be allowed for lectures and two three-hour periods for laboratory work.

Flint Laboratory. — The dairy building is practically new, and with its equipment stands as one of the best college dairy buildings in the country.

The testing laboratory is spacious and is well equipped for testing milk and its products.

About 1,000 quarts of milk are received daily, and the market milk department is equipped to weigh, clarify, pasteurize, cool and bottle this milk.

There is a 10-ton compression refrigerating system in the building arranged for making ice, freezing ice cream and cooling the ice-cream hardening box. The ice-cream room contains two brine and one tub freezer, mixing tank, emulsing and viscolizing outfits, a filling machine, and other smaller equipment.

The butter department is equipped with power and hand churns of different makes, starter-making equipment, pasteurizers, and various makes of separators.

The cheese room is equipped to make cheese of all kinds, soft cheese especially.

DESCRIPTION OF WINTER COURSES

Course I, Testing Milk and its Products (January 1 to 13).

This course is designed to fit men and women to test milk and its products in various kinds of dairy plants, or to supply some new information to those now engaged in this work. Those who do satisfactory work will be eligible to secure a State testing certificate.

Lecture and discussion topics include the magnitude of the dairy industry, secretion of milk and its composition, factors affecting the per cent of fat in milk, sampling of milk, the Babcock test for milk

and its products, use of the lactometer, the acid tests, moisture and salt testing of butter, and total solid tests for condensed milk and ice cream.

Practical application of the lecture work will be carried out in the laboratory, and all the common tests for milk and its products will be performed.

Course II, Market Milk Handling and Soft Cheese Making (January 15 to 27).

The main points to be covered in lecture and discussion are: general scope of the market milk industry, value of milk as a food, relation of bacteria to milk, sanitary production, marketing, plant construction and selection of equipment, processing, delivery, handling surplus, standardizing, grading and labeling, and care of milk in the home.

Laboratory exercises will cover milk sampling, scoring dairies, cream line problems, scoring of milk, study of milk plant equipment, milk processing, and manufacture of cottage, neufchatel and cream cheese.

Course III, Ice-Cream Making (January 29 to February 10).

Lecture and discussion on the selection of ingredients for the mix, standardizing and calculating the mix, processing the mix, factors influencing the yield, causes and remedies of ice-cream defects, manufacture of brick ice cream, special ice creams and fancy molds, marketing ice cream, and handling of ammonia refrigerating plant.

Laboratory work on the whipping properties of different creams, tests of ingredients used in the mix, study of ice-cream equipment and its operation, calculating and making up the ice-cream mix, effect on the quality of ice cream of such factors as fat content, solids not fat content, temperature of mix, temperature of lime, age of mix, speed of dasher, treatment of cream or mix, and making various kinds of frozen delicacies.

Course IV, Butter Making (February 12 to 21).

Lectures on the operation of the separator, the handling of cream for butter making, selection of the churn and preparation of starters, pasteurization of cream, starter making, the churning process, packing butter, moisture content and overrun, marketing, storing and judging butter.

Laboratory work will include a study of the construction of separators, their operation under different conditions, starter making, cream pasteurization and ripening, churning practice under varying conditions, moisture and salt testing and butter judging.

Four-Year Course

The call for students trained in the manufacture and handling of dairy products is an ever-increasing one. The Dairy Department offers a four-year course for students qualified to enter the college. This course fits men for development in teaching research and extension work, and for such commercial positions as dairy plant managers, milk sanitarians, dairy products or dairy equipment salesmen, etc.

Two-Year Course

An elective vocational course is offered for two-year students covering the subjects of milk testing, market milk, butter making and manufacture of ice cream and miscellaneous dairy products. This course prepares the men to act as cow test association or advanced registry testers and workers in all types of dairy plants.

THE MASSACHUSETTS AGRICULTURAL COLLEGE

TEN WEEKS' WINTER SCHOOL

Application for Enrollment

I hereby make application for admission to the Ten Weeks' Winter Courses which are to begin Jan. 1, 1923. I am enclosing the registration fee of five dollars (\$5) in cash, check, or money order. (Designate which one.)

Name (Mr., Mrs., or Miss).....

Home address.....

Date of application.....

My choice of courses is as follows: —

- 1.....3.....5.....
- 2.....4.....6.....
-

Kindly give us the names and addresses of two persons to whom we may refer for a statement of character.

- 1.....
- 2.....

Mail this blank, enclosing fee, to John Phelan, Director of Short Courses, Massachusetts Agricultural College, Amherst, Mass. Checks or money orders should be made payable to the Massachusetts Agricultural College.





